FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

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Laurence V. Burton, Editor

Why Modernize?

● THERE IS a curious similarity between the problems of owners of machines today and the owners of slaves of a century ago. Back in the ante-bellum days the slave was a unit of the production equipment of the times. He grew older, slower, then too old to work, and his owner had to support him, instead of being supported by his labor. Noel Polaine, who once owned 1,800 slaves, worried himself into an early grave trying to figure out how only 200 able-bodied men could support the horde of non-producers who constituted the majority of his help. Obsolescence of human beings ruined him, because under the prevailing system there was no way to solve the problem.

Likewise with the owner of machines, obsolescence can be his downfall if he cannot make the machine support him. Once the procedure is reversed—when man has to support the machine—he will be on the way out, economically, even as Noel Polaine. Under the machine system there are no moral or legal restrictions upon getting rid of non-productive equipment. Scrapping such a machine is not murder and, instead of being an economic crime, it is a praiseworthy act. No firm is rich enough to support high-cost equipment, regardless of the excellence of the quality of the product that it may turn out.

Admittedly there is no problem more complex than management of a business during a period of declining prices. To ascribe all the ills of business to any one cause, such as obsolescence, would be an absurdity. Many things are wrong in the world today: debt, overcapacity, selfishness, surpluses, dumbheadedness, fear, chain stores, rackets, the B.E.F., obsolescence, price-cutting, unemployment, farmers' strikes, labor strikes, Republicans, Democrats, Socialists, Communists, and the Federal Farm Board, to mention only a few. But what can be done about them?

Go back and reread the list. Add all the other ills of the world you can think of, then try to figure a way out. What are the things that we, ourselves, acting on our own initiative, can do to bring about better conditions? The consumer goods industries are doing fairly well, even after three trying years of depression, but the capital goods industries are the ones that are way, way down. General business cannot have a good revival until those industries that make machinery, raw materials, and equipment—called capital goods industries—once more get under way. Their activity today is rated at about 20 per cent of normal. One-fourth of all the unemployed men are a direct result of their inactivity.

In a sense, we are in the midst of an economic vicious circle. It can be broken at several places, but until it shall have been broken, the world will be full of woes. If agriculture would curtail its own operations to a point where its products would have real buying power, or if weather conditions would bring this event about, the vicious circle would be broken. But it is too late in 1932 for weather to have a marked influence on agricultural production. If all our surpluses were to be hauled out to sea and dumped, as Brazil is doing to its surplus of coffee, it would break the vicious circle. Likewise, a sudden disappearance of about 50 per cent of our industrial capacity would start things going.

But all of these conjectures call for someone else to do most of the work or carry the brunt of the burden. The one thing that we ourselves can do is to tackle the problem of obsolescence. No outside cooperation is required. No act of Congress or act of God is needed to start the campaign of modernization. In modernizing or reequipping for profit is found the only way to live at all comfortably with present conditions. Yet by doing this we are doing the very thing that will help to stimulate a general business revival.

That is the reason why the federal administration called the Aug. 26 conference of banking and industrial committees in Washington, and it is the reason why FOOD INDUSTRIES, as well as the whole McGraw-Hill

Publishing Company, is putting its energy behind the program.

There are only three possible objections to modernization that might be of any magnitude. One of them is lack of money; the others are lack of a need and lack of a plan. To meet the first objection the government is bending every energy to get credit facilities available to all who can use them properly. Our own task here is to show how it can be done and what can be done.

"But why should I modernize?" anyone may well ask. It's a fair question; why should you? As far as we can figure it out, after months of study, there is no valid reason to modernize except the selfish one of making more profit, or even some profit. Unless you can invest money this way to get a satisfactory return on it, or at least can thereby curtail some of the losses; if, after you read this issue of FOOD INDUSTRIES, you do not see how you can invest money with profit, then by all means do not spend it.

It is well, however, to remember that old maxim of business, *"Costs Can Be Reduced,"* before deciding adversely. Costs always can be reduced. The only question is whether the cost reduction obtained is a satisfactory return on the investment if new equipment is required. It is your job to determine that; and if it pays, then modernize.

A careful study will reveal that modernization, properly planned, will yield a better return on the re-equipment investment in many cases than on the whole business.

Successful firms are continually modernizing

Who ought to modernize

• If we pursue our philosophy that modernization is a profitable investment, and to be done solely for the selfish purpose of making more money —or perhaps smaller losses—then it would seem that modernization is needed by all firms that are not earning satisfactory profits.

It *seems* that way, but to find out as nearly as possible what the facts really are we have asked a number of firms in the food field what they thought about it. There was a twofold purpose in this inquiry. Primarily it was to provide a survey of the needs of industry, the potential business, and credit needs in order to get business going again in the capital goods industry. This survey was made as a move in cooperation with the Committee on Industrial Rehabilitation recently appointed by President Hoover, of which A. W. Robertson is chairman.

One very significant fact came to light. Most of the food manufacturers that are noted for their earning ability are always modernizing. They never stop. They have plenty of money to buy anything they need, and as soon as it is a demonstrated fact that reequipping is a profitable venture, out goes the old equipment and in comes the new.

Of course, such a discussion soon comes to the point where the old question about the priority of the egg or the hen has to be settled. Is a business profitable because it has the best equipment, or does it have the best possible equipment because it earns lots of money? Each side of this debate will have plenty of champions, yet for the most part those who manage money-making companies support the view that modern equipment enables them to make a satisfactory profit.

Recently we visited a large bakery where a large number of perfectly good brick peel ovens were torn out and a single traveling oven took their place. There was not a thing wrong with the brick ovens except that it costs more to bake bread in them than in the new type of mechanized oven. The baking company could have continued producing its bread in the brick ovens for many years to come. The quality would have been the same quality as before, yet it modernized. And the profit on the modernization expense is at the rate of about 25 per cent a year. Not bad; not bad; in fact, not half bad.

Obsolescence

• Equipment becomes obsolete when a competitor, either direct or indirect, utilizes a practice or a machine that is cheaper to operate than yours. He may hold his prices high enough to enable a high-cost competitor to continue to operate. He may be smart enough to keep the price up, so that the high-cost firm *will not be compelled to modernize.* Like one firm of our acquaintance, he may leave it optional with his competitors as to whether or not they shall duplicate his facilities. But trusting to luck like that is folly.

A manufacturer who modernizes for lower costs has two possible avenues open to him for his next move. He can lower his prices and drive his competitors to distraction, and ultimately they must modernize or fold up. Or he can take his profit like a gentleman, advertise extensively, and capture the market via the more chivalrous method of superior merchandising. But in either event, the competition which has not modernized is bound to lose.

Out of a test list of food manufacturers, only two admitted the need of modernization, and they were the only ones that needed credit accommodation for the purpose of carrying out such a program, but were awaiting such a time as the credit facilities would be available.

This does not tell the whole story, however. Approximately two-thirds of those to whom we sent questions failed to answer our letters or the follow-up. It is difficult to say just how those who failed to reply should be classified.

Our best estimate, after careful study, is that the present replacement value of all obsolete equipment in the food industries is about $175,000,000. In 1932 this looks like a large sum, yet the dairy group alone usually spends from $75,000,000 to $100,000,000 a year for new equipment and supplies when business is normal. As one correspondent puts it, it is extremely difficult to determine just how much of the normal purchases of an industry should today be classified as deferred purchases soon to be made.

Credit needed

• While many capital goods producers state that they are able to finance their customers' purchases, there is still a great volume of business, real potential needed modernization, that the equipment makers know about, and it is not shown by a questionnaire sent out to food manufacturers. Through their sales organizations, most capital goods producers know the volume of the potential business to be had if the buyer could pay for his purchases. From the figures obtained from the equipment manufacturers we have determined that the food manufacturing industries need a credit of approximately $100,000,000 for modernization.

What to modernize

• To some executives, modernization means nothing short of revolution, yet it can mean anything from a new type of motor to correct the power factor up to a complete new plant such as Gorton-Pew has just built. It may mean a new floor that will prevent leaking or unsanitary conditions, or permit more easy trucking; or it may mean a new byproduct power plant. Modernization can involve a better closure for a package to eliminate a spoilage item, small in itself, yet huge in the course of a year; or it may be a huge new production unit that can save 75 per cent of the fuel bill, such as one of the newest types of traveling ovens in a large baking plant.

Reequipping may involve replacement of a troublesome drive with one that is wearproof and foolproof, or it can be the replacement of a lot of leaky pipe connections that entail endless maintenance charges by an all-welded construction.

It can involve a change over from brine-refrigerated units to flooded ammonia units to secure greater flexibility and get rid of a cumbersome brine cooler. Perhaps the warehouse itself needs attention, and the use of lift trucks that pile goods high enough to utilize space more effectively would release a whole floor for other uses.

Sound investment

• Every proper modernization move is predicated on sound investment principles. No one should spend money in 1932 merely for the sake of spending it. He should see where he is going to get it back again before he spends a cent. Some of the most effective modernization must be preceded by time and motion studies in order to determine just what should be done. There is no magic in reequipping for profit. Careful planning is the indispensable basis for any move. Of course, there are a few outstanding moves that can be made that will yield huge returns, but, for most plants in the business of manufacturing foods, a modernization study will reveal a multitude of small details to be improved.

Overcapacity

• There is a real danger that modernization may be carried to an uneconomical point, once a firm sees the benefits that come from it. A safe rule to follow is to modernize all the equipment necessary to produce the present volume of sales in every concern. Whatever volume can be sold today should be made with the very greatest economy possible, and if that economy will pay a good return on the cost of new or better equipment, then by all means get it.

But do not modernize beyond present volume! Curiously enough, this same point of view is expressed by nearly every concern with whom we have talked that is in the business of selling modern equipment. They, too, realize that for the greatest good of all concerned we must stick to a conservative program.

It is far better to have any excess plant capacity clear of debt rather than to have unused equipment modernized but encumbered with loans and idle. Whenever any concern gets into this sort of a situation it almost inevitably leads to price-cutting; and then what becomes of the economies and profits of modernization? Read what S. A. Weart has to say in this issue about the penalties of overexpansion. Everyone knows them, but he explains exactly where the troubles come from.

As a final admonition to all who modernize for profit, we urge scrapping all of the obsolete equipment which is replaced. If old equipment is sold to a competitor at the usual low price of second-hand machinery, he is being offered a set-up at so low a capital investment that he may be able to compete with more modern facilities which have cost the full new purchase price.

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TO SUMMARIZE:

Modernization is reequipping for the sole purpose of making money on the investment.

Costs can be reduced.

Modernization covers everything from a new truck to a new plant.

Reequipment should be extended to cover only the present volume of business. Never modernize beyond your ability to sell.

Scrap the old equipment!

General Baking Co. Modernizes Continuously

By FREDERIC H. FRAZIER
Chairman, General Baking Co.
New York, N. Y.

ANY production executive is constantly alert to new ways to improve the quality of his product or to reduce the cost of his production. In the General Baking Co. this attitude has been cultivated by a policy of continuous modernization, which has been followed out ever since the company was formed, in the year 1911, and this activity has been intensified during the last six years.

The management is constantly studying suggestions coming from department heads, plant managers, employees, as well as initiating plans of its own. By constantly putting the best ideas into effect, a further flow of good ideas is stimulated. All proposals are carefully analyzed, both as to the technology involved and the economic situation of the area served by a plant immediately concerned. Our experience has proved conclusively that the company can make more money with its equipment of the most economical type possible to obtain and kept in the best possible condition than by awaiting a period when modernization might be forced upon us by outside circumstances.

There are, however, a number of factors to be considered in any steps in the practical operation of our continuous modernization policy. First and most important of these is that any betterment of plants or equipment shall be of such a character that it will earn a satisfactory profit on the costs. This profit may come from two sources: lowered cost of production or an improved quality of goods that will result in larger consumer demand. The possibility of earning a profit depends, in part, on the economic condition of the consuming public in a given area. If one of our plants is located in a region which has been so severely affected by current conditions that the buying population has been decreasing in number through drifting away to different areas, a modernization project of major size holds less possibility of being a profitable enterprise than one in a community where unemployment is less severe. Therefore, under these circumstances, a major betterment may have to be deferred until we can be reasonably certain of the continued size of the population.

Another factor is the influence of a betterment on the capacity of a plant. It is well known that a large volume of production leads to a lower unit cost, but it is equally well known that an increased volume may also require a greater sales expense for its disposal. Therefore, the sales department must be given every consideration in determining what capacity changes may be involved by installing improved producing units. Building a plant whose production capacity is greatly in excess of any present or possible consuming population would be using very poor business judgment, indeed, as the struggle to fill the plant to capacity would cost more than could be saved in production costs if the plan were more commensurate in size with the community.

The fact that a bakery operates nearly every day in the week also is a factor in decisions on modernization. Changes in equipment must be made while we are operating, and frequently these changes necessitate many previous changes of a preparatory nature, so that the service to a community may proceed without interruption. The consumer wants our bread at the usual time and is not interested particularly in how we provide it.

At Providence, R. I., for example, we have been carrying out a program of betterment which is the culmination of four years of study. In 1928, we realized that our peel ovens at that plant could be replaced by a modern traveling oven with a considerable saving in production cost, but we considered it undesirable to make this improvement until the whole situation had been examined from all aspects. The modernization of the ovens was not the only step that we had to consider, for a traveling oven can operate more effectively if it is used in connection with continuous bread coolers which, in turn, will feed directly to the slicing and wrapping machines. Once a program of betterment is started, we believe that it should ultimately result in a modernized whole rather than a plant that is partially modernized and in which subsequent steps may be taken only after further too costly alterations that should have been provided for at the outset.

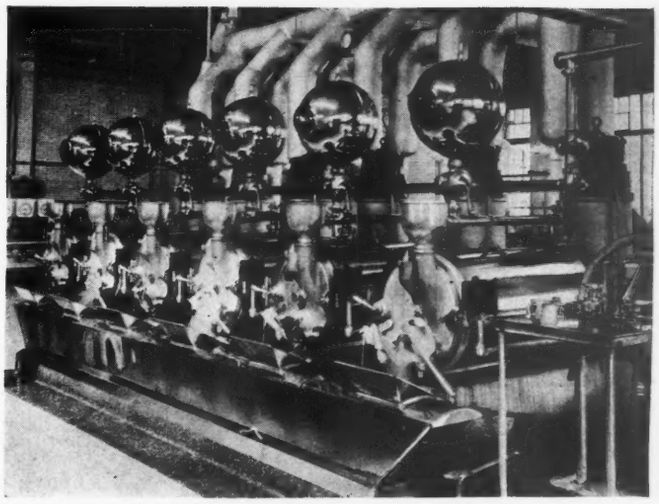
Our new oven at Providence cost approximately $50,000 and replaces eighteen brick ovens which cost when new, with their foundations, over $100,000. Depreciation through the years, of course, had reduced the book value of these brick ovens to considerably less. In addition, the installation of the cooling arrangement and other necessary equipment raised the total cost of this improvement to approximately $98,000. The difference in production costs will pay a large percentage of return on this new investment even after charging off the obsolete equipment formerly used. Other benefits have accrued, such as greater flexibility and uniformity of product.

The old type ovens required many hours to heat to the proper baking temperature, whereas the new ovens take only about three hours, and the accuracy of control of baking heat is so much improved that the quality of the bread itself is better; and the oven itself can be operated continuously 24 hours each day and produce a uniformity and quality that were not possible under the previous conditions. Even though the plant is not operated to full capacity, the flexibility of modern equipment still shows a saving over the older methods.

Our plans in the modernization of this or any other plant are made with sufficient deliberation so that we may definitely ascertain the actual resultant value of this step, both technically and economically. This information is important to the management to serve as a basis on decisions for similar improvements in other of our plants. We believe in knowing how well we are investing our capital.

New Plants New Equipment New Methods

By **FRANK K. LAWLER**
Editorial Department
Food Industries



Group of 100-quart high-speed freezers at the Reid packaging plant on Fifth Ave.

ALTHOUGH they have been furnishing the world's largest ice cream market with the bulk of its supply for years, New York's famous ice cream plants had room for improvement. And to that end, some millions of dollars has been invested in remodeling, reequiping and pioneer development by the metropolitan ice cream division of The Borden Co. and associated companies. And Borden has not merely brought its plants up to date; it has introduced new methods of doing things, at least three of which are major developments in the industry.

One of the main ideas for this extensive modernization has been the separation of bulk and packaging operations to provide for more efficient utilization of plant equipment and more uniformity in the product. To accomplish this, production has been concentrated mainly in four plants. One plant at 24th St., Manhattan, makes all the bulk ice cream for J. M. Horton Ice Cream Co.; one on Waverly Ave., Brooklyn, produces the entire bulk supply for Reid Ice Cream Corp.; and another at Woodhaven, L. I., does the same for Anheuser-Busch. Packaged goods and novelties for the entire group of associated companies are manufactured at a Reid plant on Fifth Ave. at 141st St., Manhattan. This is the largest ice cream plant in the world, having a capacity of 15,000 gal. in an eight-hour day. And so many innovations have been introduced in the plant that it is considered to be five years ahead of its time.

In all these plants, material follows a highly mechanized route from the unloading platform to the point where the ice cream goes into cans or packages. Taking the Reid packaging plant as example, cream and milk in cans is unloaded from trucks onto a roller-type gravity conveyor that carries it to an automatic elevator. The elevator lifts the cans to the top, or third, floor and discharges them onto gravity conveyors leading to a refrigerated storage room. From there, a power-driven horizontal chain conveyor carries the cans to three 1,000-gal. glass-lined, steam-jacketed, vertical batch pasteurizers set in the floor.

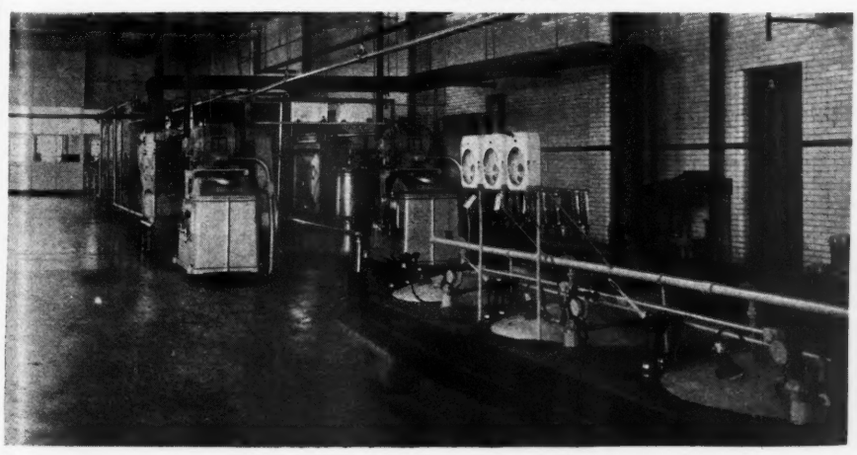
Bulk ingredients are added in the pasteurizers and the mix is blown by air under a pressure of 8 lb. per square inch to two pressure filters. From the filters it passes successively to two 1,000-gal. homogenizers operating at 3,000 lb. pressure, and over two 20,000-lb. cabinet coolers that reduce the temperature from 165 to 32 deg. F. Then it is pumped into one of three 5,000-gal., or one of three 2,000-gal., stainless steel holding tanks, from which it is forced by air to a freezer. The finished ice cream empties into a gravity hopper and passes to a forming or packaging operation on the floor below. The Reid plant has six high-speed and three slow-speed 100-qt. batch freezers and fourteen 80-qt. low-speed freezers.

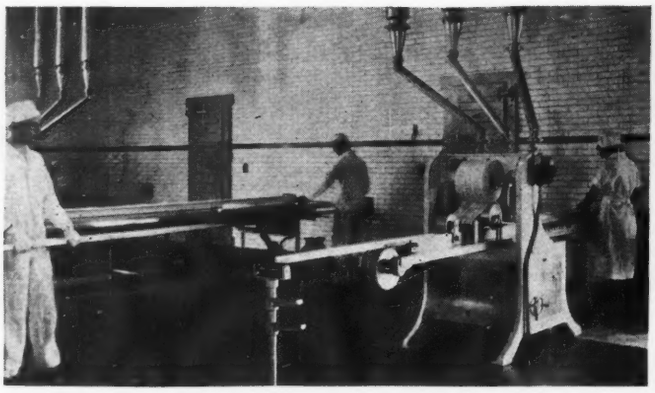
Besides the equipment already mentioned, there is on the top floor of the Reid plant a production office, a testing laboratory, a department where all the flavors are made up and measured out for the freezers, supply storage rooms, a stockroom where clean uniforms are kept and given out to the employees each day as they punch the time clock, and equipment for making Popsicles.

The latter includes three 2,000-gal. glass-lined holding tanks that receive the mix after it has been homogenized and cooled to 28 deg. F. These tanks supply mix to a mold filling tank. The metal molds are carried to the spouts of the filling tank and thence to the end of a brine freezing vat by a belt conveyor. About 20 minutes is required for freezing, and as fast as one mold is removed the others in the tank are pushed forward with a lever to make room for another. The brine vat will freeze 20,000 Popsicles daily.

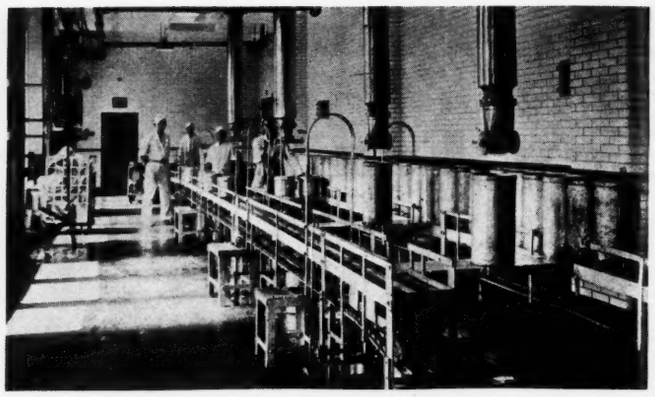
By far the most significant developments in this ultra-modern Reid packaging plant are found on the second floor, where forming and packaging takes place. Of particular importance is the ribbon machine. Aluminum trays, 12 ft. long, pass through this machine and are lined with trademarked paper fed from a continuous roll. Then three

The pasteurizers, filters, homogenizers, cabinet coolers, holding tanks, and laboratory at the Reid packaging plant





Ribbon machine at Reid plant. Hardened ribbons may be seen on cutting table at left



Can filling room at Horton bulk plant. The conveyor extends to a hardening room

flavors of ice cream, forced from a three-section nozzle, fill the paper-lined trays with a continuous triple-flavored ribbon of ice cream. The filled trays pass into a hardening room through a small opening in the wall, and a man sets them on a rack over refrigerating coils. The trays are put in on one side of the rack and taken out on the other, being pushed across a little at a time as a new tray is added. Spring stops are provided to stop each tray when it is directly over one of the coils. The temperature in the hardening room is about —35 deg. F., and it takes only about two hours to harden the ice cream.

As workers take the trays from the hardening racks they push them through an opening in the wall to a cutting table. There a man dumps the paper-wrapped ribbons in a pile and places several of them between holding clamps. Then a rotating knife cuts off short lengths which are packaged and sent to the holding room. The cutting and packaging line-up will handle 600 gal. an hour, the output of the plant's two ribbon machines.

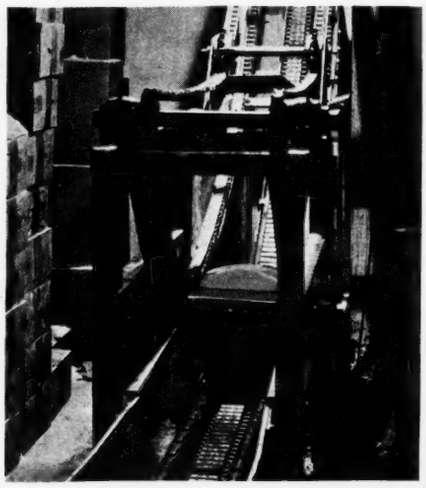
The ribbon machine has many advantages. It produces a three-flavor ice cream with a sharp line of division between flavors; it is simple and therefore relatively inexpensive; it speeds up production and reduces the amount of handling; it obviates washing of molds or forms; and it produces a more sanitary product. The ribbon machine may be used to produce bricks of various sizes, since the depth of cream is increased by slowing down the conveyor carrying the tray under the filling nozzle. A machine of this type would seem to provide a simple and inexpensive means of packaging multi-flavored ice cream in pints and quarts.

The second outstanding development in packaging equipment is a machine that puts three-flavored ice cream in pint and quart cardboard containers at a rate of 600 gal. on hour in pints and 1,200 in quarts. This machine, the only one of its kind in existence, has an endless conveyor to which metal cups are attached in rows of four. Into these cups girls set the empty containers, supplied by a chute from the top floor where they are set up from "flats." As the conveyor moves along, the flaps are opened back, the containers filled, the flaps automatically closed, and the packages discharged onto a conveyor. The packages are then put into wire baskets and set on another conveyor that passes through a hardening tunnel. There they spend from 45 minutes to two hours in a strong blast of air at a temperature of about —25 deg. F. The hardened packages, whose temperature at the center is —2 to —5 deg. F., are taken from the basket as they leave the tunnel, placed on a belt conveyor and carried to a bundling machine. Another conveyor takes the bundles to the holding room.

The vital part of the pint and quart filling machine is a mechanism that fills containers from the bottom up. This comprises four metal "boxes" that reciprocate through a horizontal cylinder. Each box has three compartments, one for each flavor, and in each compartment is a piston. In the first step of the operation the cylinder rotates to put the boxes in a horizontal position with each compartment over a nozzle that discharges a particular flavor of ice cream. After the boxes are filled, the cylinder carries them to a vertical position, and by that time a container is under each to receive the ice cream. Next, the filling box moves downward into the container, the pistons traveling with it. Then the box rises and the pistons force the ice cream from each compartment into the container, the pistons themselves moving downward slightly to insure compact filling. While the containers are receiving ice cream the conveyor carrying them is automatically stopped.

The machine that bundles the pints and quarts before they go to the holding room is a standard wrapping machine such as is used in a bakery, but its application to packaging ice cream is something new.

An interesting operation in the plant is the manufacture of Frosticks. The ice cream for these is spouted from the gravity hoppers into slab forms. Conveyors carry these into a hardening room where they are set on racks over cooling coils. After a half day or more at a temperature of —35 deg. F. the slabs are transferred to a tempering room where the temperature is —16 deg. F. After about four hours they are soft enough to cut without chipping.



Lowerator at Horton plant. It carries filled cans from hardening room to holding room one floor below

As they are taken from the tempering room, the slab forms are put into a steam defrosting device to free the ice cream. Then the slabs are "dried" in a solid CO_2 refrigerated box and passed through machines that cut them into pieces and insert a stick in each piece. These pieces are passed through a chocolate dipping machine, packaged and conveyed to the holding room. The plant has two dipping units, each of which will handle 4,000 dozen Frosticks daily.

Although the Dixie Cup, sherbet and ½-pint cup machines are standard equipment, they are fed by a new system. Where sixteen hoppers and spouts would ordinarily be required for the eight Dixie Cup machines, only two are used and the ice cream is pumped to the machines from those. Also, the cups are discharged onto a belt conveyor, at the end of which girls put

them into wire baskets on the hardening tunnel conveyor. When hard, the cups are packaged and sent to the holding room.

Probably the greatest of all the advanced features of the Reid packaging plant are the two hardening tunnels. These are 100 ft. and 90 ft. long, respectively, and are large enough to accommodate a gravity-type roller conveyor that completes six circuits, one below the other. To keep the baskets moving, two power-driven endless chains, one above and one below the conveyor, are connected by rods that push the baskets along. To eliminate the possibility of a jam, the driving chains are provided with a control that cuts the power off in the event of slight overload. The main conveyor never leaves the tunnel but is fed by one small chain conveyor that goes in and out of the tunnel through vestibules. This effects economy in refrigeration.

Some five miles of flooded ammonia coils refrigerate each of the tunnels. The coils are located in the top of the tunnel and fourteen 30-in. fans, each delivering 8,000 cu.ft. of air per minute, create a blast that passes over the coils, down to the floor at the center and up through the conveyor. The floor and ceiling are "V"-shaped to provide proper baffling.

Not only do these hardening tunnels speed up production but, what is more important, their fast freezing improves the quality of the ice cream. This also holds for the slab and ribbon hardening rooms.

One thing that has enabled The Borden Co. to secure such highly mechanized operation in its New York ice cream plant is the proper application of standard conveying equipment and the design of special apparatus where needed. In the Horton bulk plant, for example, a special lowerator was installed to carry cans from the hardening room to the storage room on the floor below. This comprises an inclined chain conveyor above which are two endless chains connected at intervals by slats. As a can travels down the incline it is held back and kept from tipping over by one of these slats. To admit a can to the lowerator when a slat is in position to receive it, two stops are used. The first lets the can pass to the second, holding all others back. The second then detains this can until a slat comes around to receive it.

Entirely new refrigerating equipment has been installed at the Borden plants. The Reid plant has a "low-temperature" booster system with a 205-ton capacity per 24 hours, a "high-temperature" booster system built for 68 tons, an ice manufacturing system of 92 tons and a high-temperature refrigerating load other than ice manufacturing of 60 tons. The suction side of the low-temperature booster system is connected to the hardening tunnels, the slab and ribbon hardening rooms and the holding rooms. In the hardening tunnel coils, the ammonia liquid is recirculated to insure a continuously wetted surface. The slab and ribbon hardening room coils are of the flooded shelf type, a new design which provides even distribution of liquid in each pipe by a weir at the end of the pipe. The three holding rooms are equipped with the flooded ammonia gravity system with automatic float control, and each has two banks of coils, either of which may be cut out.

The high-temperature booster system serves the calcium chloride brine units that cool the ice cream freezers and the Popsicle freezing tank, this brine being refrigerated to —10 deg. F.

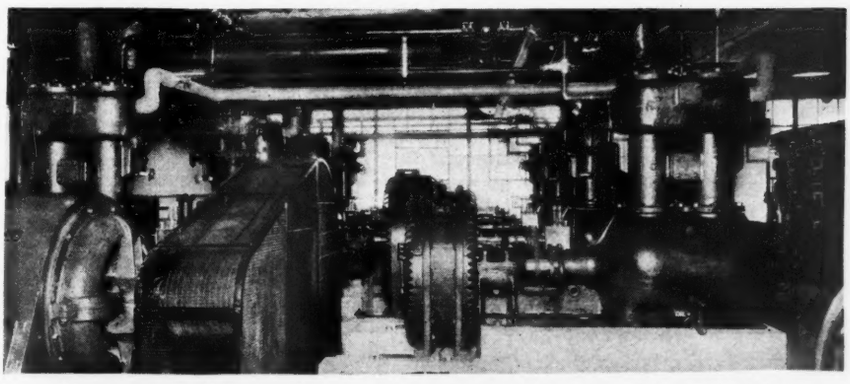
The boosters, which are of the centrifugal type, take the gas at 0 lb. gage to 14 in. of vacuum and discharge it at 20 lb. gage through a water gas intercooler and a direct expansion shell and coil liquid intercooler to high-pressure vertical compressors. These compressors, which also serve the brine systems that make the ice and cool the mix, discharge the gas at 150 to 175 lb. gage through shell and tube open condensers cooled by water from an atmospheric cooling tower.

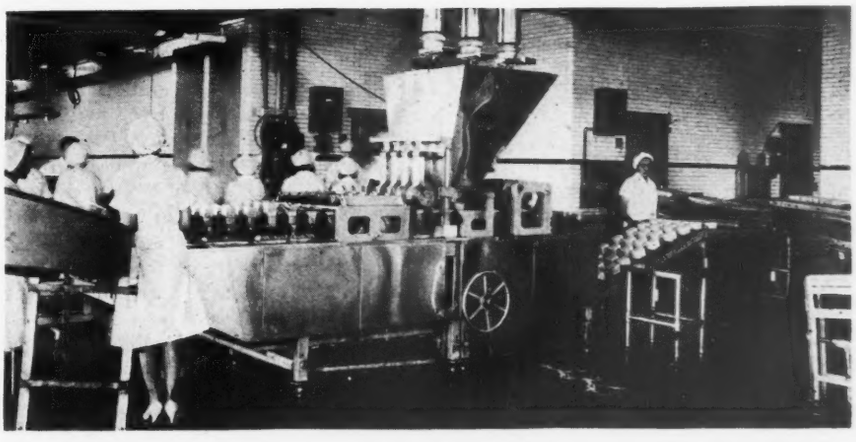
The plant has four 20½x18x19-in. double-acting and one 20⅜x18x19-in. single-acting rotary boosters and three duplex and two simplex 10x10-in. vertical compressors. The duplex compressors are driven by 250-hp., 300-r.p.m. synchronous motors which are so mounted that they may be slipped off the shaft of one compressor to permit its repair while the other is kept in operation. One of the compressors on the high-pressure stage side and one booster on the low-temperature system are driven by four-speed induction motors. To provide additional flexibility, the compressors are equipped with capacity bypass reducing valves.

This flexibility is employed to advantage in keeping the peak demand of electrical power under a certain figure. And to obtain a minimum demand charge, the refrigeration load is distributed over 24 hours, carrying the holding rooms at night and the processing units during the day. By doing this and keeping close watch on the demand meter, several hundred dollars in power costs is saved each week.

To supply steam for the Reid plant, two new 150-hp. horizontal return tubular boilers have been installed. These are fired by oil burners and will produce 200 per cent of rating.

With its plants so completely modernized and with bulk and packaging plants separated, The Borden Co. will be able to produce ice cream of uniformly good quality and do it efficiently. And it will not be hampered by obsolete equipment when the demands of normal business have returned.





Above, the 10x10-in. vertical compressors in engine room of the Reid plant. Below, pint and quart filling machine at Reid plant. It fills containers from bottom up

Penalty of Overcapacity

The Lesson From This Depression

. . . A Contrast to 1921

By SPENCER A. WEART
New York, N. Y.

"THE automobile industry in this country is largely overbuilt, since it has plant facilities with an annual capacity of 9,000,000 cars, while the present output is 2,000,000 cars."[1]

"The overcapacity of the [fertilizer] industry is such that it could produce almost double the amount of mixed fertilizer now being manufactured."[2]

"In 1928 our idle or surplus factory space in buildings (not including land) amounted to something over 300,000,000 sq.ft. (about 10 per cent of the total). . . . Now our idle factory space is about four times what it was in 1928."[3]

There is an awakening consciousness of the wide extent to which overcapacity has gripped entire industries as well as individual plants. Just as the outstanding lesson from the depression of 1921 was the value of maintaining low inventories—a lesson that has become a maxim in management's copy book—so perhaps the outstanding lesson from the current depression will be a fuller knowledge of the evils of overcapacity and frozen capital; of the dangers of inflated depreciation, taxes, insurance, and other fixed charges.

Relative importance of fixed charges is determined wholly by type of industry, rather than by the individual plant. Steel and paper manufacture require heavy investment in machinery and plant, and consequently heavy fixed charges; typewriter manufacture requires much less capital; shirt making comparatively none at all. But within an industry where competition is sharpest, the company which does not have to absorb excessive fixed charges has a marked advantage. Companies laden with excess capacity far beyond their present needs find that what originally was merely excess capacity soon becomes obsolete capacity; but the excess fixed charges, unfortunately, still remain.

In times when production is high, a small increase in the capital invested in fixed assets will have only an apparently insignificant effect upon cost per unit; but when production falls to low ebb the former trivial increase in fixed expense irresistibly multiplies itself until it may become the all-important factor in profit and loss statements.

Total fixed expense divided by total production equals fixed expense per unit of production—for short, unit fixed expense. The curve of unit fixed expense plotted against production is hyperbolic in character, which is simply another way of saying that at any rate of operations production multiplied by unit fixed expense is a constant. The characteristics of the curve are shown in Fig. 1: as production approaches a maximum, unit fixed expense becomes a minimum, and conversely, as production decreases, unit fixed expense rapidly approaches its maximum.

The figure illustrates graphically the disastrous effects in times of low production of an increase in fixed expense made in happier days. If, for example, the lower curve, *A-B*, represents the former amount of fixed expense, an increase in fixed expense to *A'-B'*, caused by sinking capital into new buildings, machinery, or other uses, will, at the high production level, *P'*, cause an increase in unit fixed expense of only the small amount *B-B'*. But when production falls to a lower level—for example, *P*—the increase in unit fixed expense caused by the expansion program is now *A-A'*, an amount increasingly greater than *B-B'* in proportion to the decrease in production from *P'*.

It will frequently happen that at lower production levels a competitive upper price limit appears that makes it impossible to absorb all of the cost in selling price. If, for example, this upper limit appears at *C-C'*, then the only recourse of a management desiring to remain in business is to absorb a portion of the fixed expense—shown in the figure as *A'-A''*—as an administrative expense not chargeable to cost of sales, but decreasing profits just the same.

The real cause of any company's getting itself into such an embarrassing position is the calculation of the effect upon unit cost of an increment of fixed expense at too high a production level. If a lower level of production had been used, the increased fixed expense per unit might well have been so great as to nip an unwarranted expansion program in the bud. It is a common mistake to figure depreciation charges on new buildings for a 30-year life, and then, to determine additional unit cost, divide the additional fixed charge by a production volume which even the most supreme optimist would not expect to maintain for the next thirty years. Fig. 2, a 25-year sales chart taken from the records of an old established firm, illustrates the point.

For peculiar reasons, a discussion of which is not germane to this article, the company was able in 1919 to increase radically an apparently fixed sales volume. For the next ten years sales were more or less artificially kept at an uneconomically high level, external pressure in the ensuing few years then forcing the level down once more to a volume which apparently can be sustained. An expansion program requiring investment of large amounts of capital, undertaken in 1922, should have been so planned as to liquidate the investment during the period in which it was expected high sales could be sustained. But, instead of using the more "normal" sales level of $2,700,000, the inflated sales level of $3,150,000 was used. So a $2,700,000 business must now carry fixed charges suitable for a volume $450,000, or 17 per cent, higher.

The future always is unpredictable, but in this case the directors of the company must have been aware, from their experience between 1919 and 1922, that the inflated sales level of $3,150,000 could not be held indefinitely. A large investment in buildings, written off over a 33-year period, and in machinery, written off over a 20-year period, was not justified even in 1922. The directors violated a simple rule, well known in principle, but not heretofore definitely formulated so far as I have been able to discover: In expanding plant capacity, any increase in fixed expense should be so regulated as to be absorbed without increasing unit cost beyond normal bounds, within the period of anticipated increased production, conservatively estimated.

Essentially, the rule merely states that expansion programs must pay their own way and that a temporary increase in sales volume is no excuse for an in-

[1]Statement to stockholders of Studebaker Corp., 1932.

[2]Statement to stockholders of Armour & Co., 1932.

[3]R. S. Harnsberger, in *Building Investment*, July, 1932.

crease in fixed expense that will shrink profit margins many years after sales have reverted once more to their normal level.

It is not always necessary to expand the physical plant to secure increased production, for many management devices are at hand whereby production can be increased with little or no additional capital outlay. The means are known to every plant manager, but surprisingly seldom applied in practice. They are:

1. Utilization of Double or Triple Shift—Lesser efficiency of a night shift is overcome many fold by the resultant cutting of fixed expenses per unit to one-half or one-third. Industries in which fixed expense represents a relatively heavy proportion of total cost—notably textile, steel, and process industries in general—adopted the multiple-shift principle many years ago, but other industries have been slow in following suit, although partial exception might be made of automotive.

2. Improvement of Plant Layout—It is a rare plant indeed in which worthwhile amounts of floor space cannot be retrieved by inexpensive rearrangement of machinery, the rearrangement itself often further being justified by new operating advantages. A relocation of packaging lines in a Connecticut pharmaceutical manufacturing plant resulted in securing 40,000 sq.ft. of floor space, and canceled plans for erecting a new building.

3. Improvement in Stores Methods—In a majority of companies the storage of raw, in-process, or finished material occupies an appreciable portion of total floor space. Narrowing of unnecessarily wide aisles, filling of idle bins, and introduction of tiering skids, stacking machines, and other mechanical aids frequently will produce startling reductions in floor space. In a Wisconsin wholesale drug warehouse the stock on five apparently fully occupied floors was compressed into three floors with room to spare.

4. Introduction of More Modern Machinery—Increased plant capacity and decreased floor space per unit of production accompany the operating economies obtainable by installation of more modern machinery. A Chicago meat packer in changing his rendering plant process was not justified in an expenditure upon the grounds of operating economies, but the $25,500 spent in changing the process released 21,000 sq.ft. of badly needed floor space; the cost of new space therefore being $1.21 per square foot—one-fourth that of new construction.

5. Revision of Operating Practices—Large increases in plant capacity may sometimes be obtained through a revision of basic plant systems. Introduction of line-assembly to replace an antiquated bench-assembly method, substitution of piece-work for day-work wage payment, and other modernization practices have in different companies increased production by 30, 50 and even several hundred per cent at negligible cost.

In spite of the various means that are at hand to increase a plant's capacity without adding to fixed expense, inept managements or unforeseeable events will all too frequently load individual concerns with overcapacity. When the excessive capacity becomes too burdensome, the distasteful but sound method of writing down assets is the best road to follow to normalcy.

Unfortunately, all companies do not have the financial strength, directorial courage, or acquiescent stockholders needed to follow such a direct and safe course. Weak companies will drift down the path of psychological least resistance and attempt to build up sales sufficiently to absorb excessive overhead—to "fill up the factory." Attempts to increase sales are highly laudable, provided (and the proviso is an important one) that increased sales are not obtained by disruption of the trade or an exorbitant rise in selling expense—either of which is very liable to result in merely aggravating an already bad situation. The present wild scramble to secure new products is only one manifestation of the natural desire for augmented sales. When a company has the necessary free capital to acquire a going concern for the sake of getting that concern's products and sales, the result is likely to prove successful; but, when a company seeks to develop its own new products, any essay diverging from its established product line is really an effort to establish a new business using the capital of the old—and the result in a large majority of cases is inevitably catastrophic.

The best means of avoiding the pitfalls of attempts to increase sales, or the bitter dose of deflation of assets, obviously is the avoidance of having any overcapacity. A hope is expressed that the ill wind of depression has at least brought home one fundamental lesson: the sad effects of excessive plant capacity.

Read 'Em and Weep! These curves tell just where the grief comes from when the plant is overcapacitated. Every reader who is in an executive position—or ever hopes to get there—should master the fundamentals of the penalties exacted by overexpansion.

Fig. 1

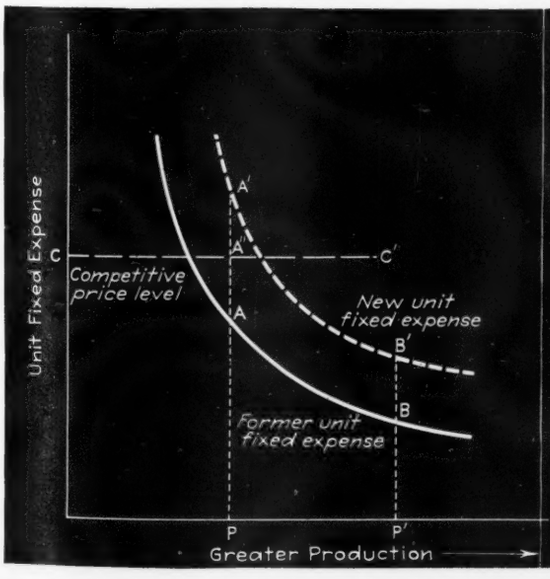
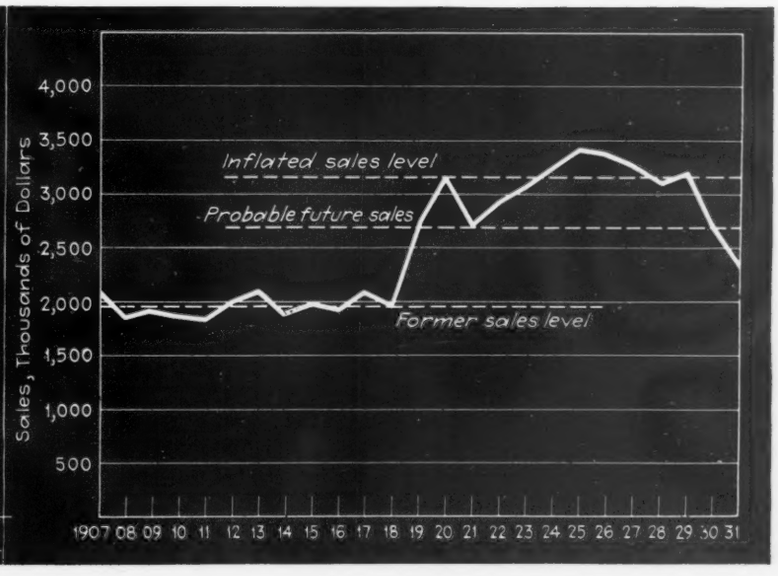


Fig. 2



Modernizing and Reducing Capacity Profitable to the Flour Industry

By M. D. BELL
Consulting Engineer
Minneapolis, Minn.

CHANGES forced upon the flour milling industry in recent years by the stern necessity of conditions following the War have been extensive beyond recognition, except by those immediately affected. The January issue of FOOD INDUSTRIES contained an editorial entitled "Overcapacity: The Neglected Factor in Distribution." It showed how in general manufacturing, productive capacity is not correctly geared to consumption. It put the responsibility for the ultimate solution of distribution problems back on the shoulders of the production man. This general statement is entirely justified by the experience of the flour milling industry, particularly in the present drastic period of survival of the fittest. The adjustment of production to consumption is essentially a responsibility of management.

In the flour industry the producer and the distributor are one. They may be separate departments of the same organization, but it has been the function of the executive management of these larger milling companies to adjust one to the other. That there has been no large separate group in the field of distribution with diverse interests or different sources of information, is basic for a clear understanding of modern developments and may indicate what may be accomplished under successful cooperation between production and distribution men, to the benefit of everyone.

It cannot be claimed that this industry has done anything radically new. But it has put its own house in order, under the most trying conditions that have faced any industry since the War. The methods were not apparent when the need for some radical changes was first felt. The steps were worked out, one at a time, by the sweat and determination of production men, who were informed of the situation and who refused to accept the discouraging suggestions that the milling business was too old to change or that this business was "different." They saw the need and applied the principles and methods that had brought success to other lines of manufacturing. The improved condition of the industry today is largely due to this far-seeing and courageous work.

The War had caused many idle mills to resume operation and permitted many obsolete mills to take on a new lease of life. Many of them were improved during that period by the addition of new machinery or improvement in mill flow to the point where they seemed to be pretty good. The new owners were very reluctant to admit that they were "war babies" or to terminate their operation with the end of the emergency, after the post-war slump in 1921.

Milling has always enjoyed a recognized position in the communities where it has become established, and entire families for generations have been identified by their mills and flour products. It was expecting too much to assume that many of these older concerns or those established by more recent improvement would give up voluntarily and go out of business without a struggle, in order to reduce the milling capacity in the United States by the 50 per cent that was soon found to be necessary. Among the larger companies, information was available to show definitely the necessity for such drastic action. Within less than a year after the need was made apparent, most of the new war-emergency plants in out-of-line locations were stripped, the new machinery was shipped to major milling points to be later substituted for obsolete machinery that was junked, and the buildings were disposed of for other purposes.

Following the War, the export demand in the United States fell off greatly, and was permanently absorbed by other foreign milling plants, thus aggravating the overcapacity here. The freight-rate structure that grew up during the War became a dominant factor in the competition between milling locations, and serious studies were given these new economic factors. The wheat supply had been changing over a long period of years, due to the growing diversification in farming and the increased valuation of farm lands, causing certain states to lag far behind former records in the production of good milling wheat. At the same time other sections were expanding their wheat acreage under the efforts of the state agricultural experiment stations.

Markets were analyzed, the balance of freight rates between wheat and finished flour and the total consumption of flour were estimated in the larger centers of population. It was found that the competition of other food products was gradually reducing the quantity of flour consumed per capita in the United States, and it long had been known that the trend was away from home baking to the use of the baker's products. Thus began the migration of flour milling capacity from Minneapolis, the "Flour City," to Buffalo, to Kansas City, to the Southwest, and the coast.

The larger companies sought means for comparing and checking their operating results. It was not enough to keep records of the wheat ground and the products turned out, with figures of yield, percentage extraction, and net results. It was necessary to extend and to elaborate the production control by laboratory and baking tests, to insure proper selection and handling of the wheat, in order to produce uniform and

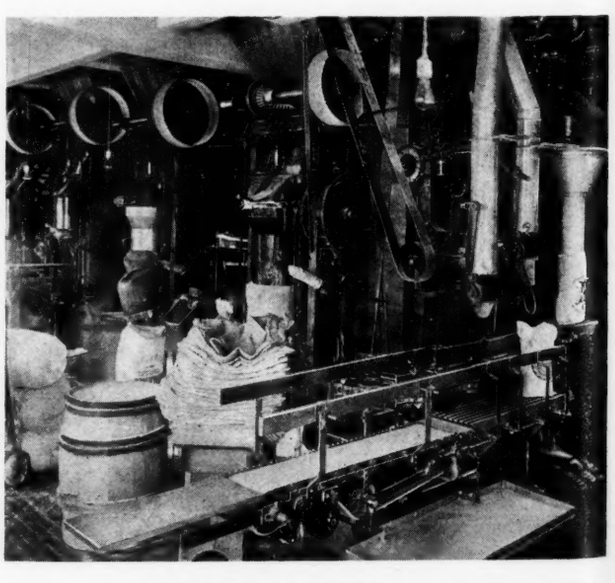


Fig. 1—Centralized installation of automatic packaging equipment has played an important role in flour-mill modernization

high-quality flour under widely different conditions.

The first recent major development, however, was to set up a comparison of costs that would be accuate and helpful in determining plans and policies. There had been less need for this in the days when operations were carried on in small units under the immediate supervision of the owner or one of the partners, and when there was a longer profit and less competition. It required a determined effort to find the proper system and to adapt it to the new large-scale operations. Not the least of the effort was that required to sell the new idea to those older men who, as heads of departments, constituted the backbone of the organization.

Milling units vary in size, in use of different machinery, in flow and in the systems used by the individual "head millers" who are the technical men in direct charge of production. These men have developed by practical experience and their personal ability and initiative from the first positions to the top. Their methods are often their personal developments. Naturally, the conditions in their mills will vary with the capacity, the size of the crews, the method of operation, and especially as determined by local conditions, buildings, equipment, trackage or shipping requirements. Comparison of costs was no simple problem with these widely varying conditions. Nor was it possible or desirable at once to question the reason for many of the differences or to attempt to change them immediately to a common operating basis.

The procedure in one large company illustrates the methods used in building up an adequate cost-accounting system. This method is more or less typical today of the entire milling industry in the United States, for through the Millers' National Federation an analysis of milling costs was prepared quite recently and distributed to its members. Members who desire may submit their cost figures at regular intervals, and later receive tabulations of all these costs, *coded* by number. Each member is informed as to his own code number, so that he can see how he compares in operating costs with his friends in the federation. This development has given the operator of a small mill the advantages, to a certain extent, of the larger organizations who compare costs in their own units in as much detail as they desire, or find profitable.

In the case under consideration, an analysis of all operating costs was made showing these as found, then grouping all elements into their natural divisions. These cost items or accounts were then numbered according to a plan, using the Dewey decimal system originally developed for library catalogs. A manual of accounts was prepared, defining the different classifications and items, and the use of the index numbers. The numbers were kept uniform in the several classes, so it was possible to memorize them easily. Separate series, but with similar numbers, were used to identify costs of different products. The use of this manual was extended to all of the branch plants. An analysis was made in each plant to determine what discrepancies there were, what differences in nomenclature, or what caused one plant to show one item of expense that did not appear elsewhere.

If construction or permanent improvements were being made in any plant, capital items were segregated under a separate series of accounts, with a job number, and set up on the books with its appropriation under this account number. This greatly facilitated the work of keeping capital accounts separate from plant maintenance. Labor on the payrolls was classified by departments, which were numbered in a similar manner, so that the code number given an employee on the time clock indicated his location, his wage rate, and the expense account to which his time was regularly charged. Regular operating crews were charged to their proper accounts from the payroll weekly. Departments working on maintenance or on new construction were charged from individual time slips made out by each man, thus insuring proper distribution. Material purchased — supplies and equipment — was covered by requisitions made out by foremen or department heads, which showed the account numbers. These account numbers were checked before going to the purchasing department by the mill office of the operating department, to insure accuracy, this work being done by someone familiar with the work and the cost plan.

Tabulation of the statistics from these accounts was made a simple mechanical operation by means of the Hollerith tabulating machine. This machine reduced the clerical labor required, speeded up the preparation of the figures, and gave immediate check on their accuracy. The figures thus prepared were submitted to the department heads at monthly intervals, with their own local costs in detail, supplemented by comparison with their competing producing-plant units in the general classifications. In plants operating several mills, these figures showed each in detail.

These figures were not always 100 per cent correct; errors occurred in the listing of major machinery items, or labor might get charged to the wrong department. But the net result was a close consideration of "Why?" and "How come?" that began to show results. The yardstick of costs was finally the cost per barrel of flour produced. As the output varied, for one reason or another, this unit cost varied. It was surprising to many to see how responsible heads began to try to keep up their operating schedule, to avoid breakdowns or delays, and to plan such improvements as would insure continuous preference in operating plans, if orders required shutting down a unit for a week.

Many of the large milling plants at Minneapolis were made up of mills that had been built by individuals at different times, of wholly unrelated design and sizes, and with many types of equipment. When the study of detailed costs began after the War, it soon became evident how these variations resulted in different costs of operation, and remedies began to assume a new importance.

The work in a flour mill is planned to meet the arrangement of the machines and the normal streams of the products. It takes one man, as grinder on each of the three shifts, to look after the grinding in a 1,200-bbl. mill, the same as it does in a mill making 4,500 bbl. per day. Similarly it takes one man on each shift to pack the feed, tending the packer constantly, in both sizes of mills On flour which can be stored in a bin, the labor can be proportioned more directly to the barrels packed, but the above indicates the variation in labor costs which reflects the size of the unit. One remedy was to combine the operations in groups to use the labor more effi-

Fig. 2—Evidence of some of the demolition which has taken place in Minneapolis. All but the warehouse of an entire mill has been destroyed. Lateral walls are left in place to brace the wall of the canal underneath the tracks at the left

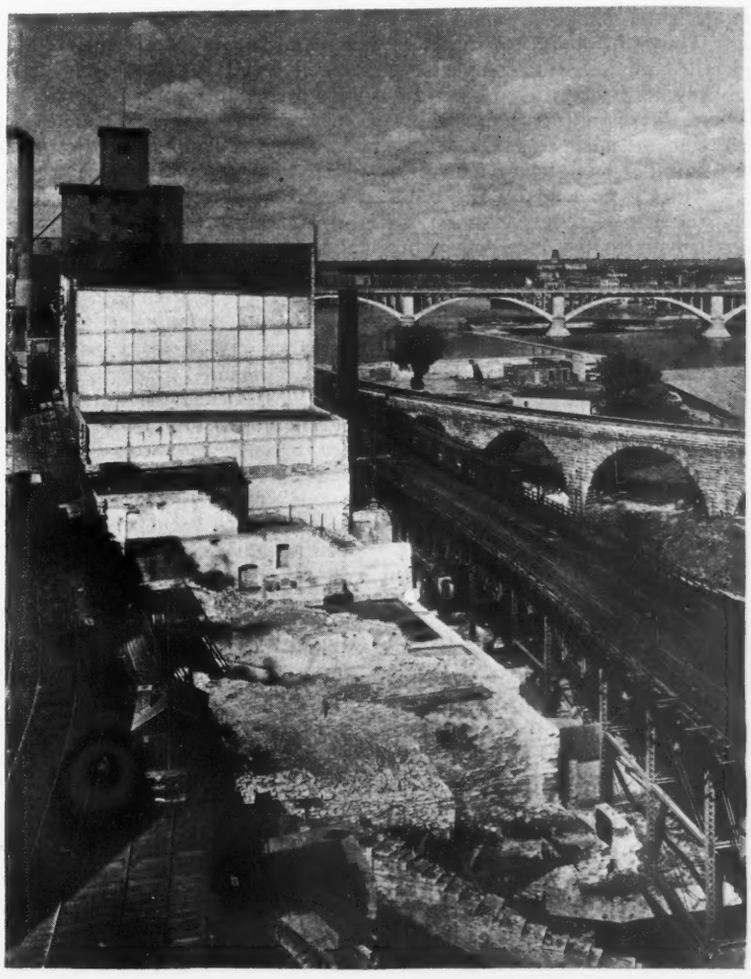


Fig. 3—Compare this view with Fig. 4, on the opposite page, to see the way that capacity has been reduced. It looked this way in 1922 when flour milling was at its height

ciently. Another was to install automatic packing equipment in these larger units where the output would justify the investment.

These studies helped to fix piece rates and hourly wage rates and to meet demand for wage adjustments. They also resulted ultimately in decisions to eliminate entirely the smaller and older milling units. In some cases the capacity thus removed was replaced in other locations. In many cases, the capacity disappeared, and the business was distributed to other units that were more efficient or better located. One of the striking things brought to light by these detailed studies and comparisons was the showing up of the cost of idleness, where the operating company had been carrying the costs of taxes, depreciation, insurance and maintenance on property which was held by the holding company but which was of no interest or benefit to the local operating management. These figures are at the bottom of the considerations which resulted in recent years *in the demolition of more than half the former milling capacity* at Minneapolis, and the enlargement or building of entirely new plants at Buffalo, Chicago, Springfield, Enid, Kansas City, Ogden, San Francisco, Astoria, and other locations. It is needless to say that the designs of these new plants or additions were worked out in minute detail in accordance with the analysis of these cost figures and the operating requirements shown by this study.

The production man has had to develop and install machinery to meet the changing conditions of the times. This new equipment can be considered under several distinct heads: (1) power equipment; (2) packaging equipment; (3) conveying equipment; (4) milling equipment, including (*a*) grain cleaning, (*b*) grinding, (*c*) purifying, and (*d*) weighing. He has had to improve his planning in processes, buildings, arrangement or location, training of men, supervision, knowledge of raw materials, and knowledge of new products.

The fire of 1928 which destroyed the "A" mill of Washburn-Crosby Co., Inc., at Minneapolis, afforded a striking example of the changes that were required by present conditions. This fire was at first considered as a great disaster, for it occurred in the exact center of a large and busy plant that was tied together as an operating unit. It forced temporary shifting of capacity and orders to other plants. It caused careful study to be given all of the plans and information at hand as to what and how to rebuild. The final result was that only a portion of the destroyed capacity was replaced, and the units were regrouped in an entirely new arrangement. The final cost figures prove unmistakably the wisdom of the plans, but it would have required more than usual courage and ability to urge the demolition of the former units and the substitution of the modern mills, had not this been forced by the fire.

One of the major changes that have come to the milling industry in recent years is the change in products which was accompanied by changes in packaging requirements. Rye flour came into general demand, and the millers built units to make rye flour in a variety of grades. Whole-wheat and graham flour became popular, and involved shipping in mixed cars with other products, instead of the former solid cars of but one variety. The use of durum wheat to make semolina, for macaroni, spaghetti and other similar products, became an established business which grew rapidly during the War, and permitted the use of the yellow durum wheat which was introduced from Russia for farms that would not produce a profitable crop of bread wheat. This semolina manufacture required a new technique in milling and the development of new laboratory apparatus to check results, to help in the selection of proper wheat, and to give the desired uniformity in color, granulation, freedom from specks, and the strength to dry without falling from the "sticks."

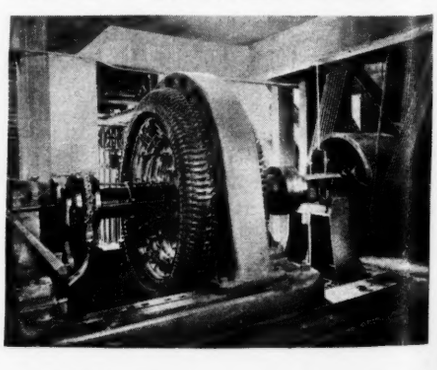
Commercial mixed feeds were a development of the agricultural experiment stations, with formulas to fit every need of beast or fowl, from birth to market. This required handling of many new grains and ingredients, which had to be mixed to an exact formula, handled in large quantities, and loaded into mixed cars, as required to meet seasonal feeding requirements. This mixed-car business resulting from many products changed the arrangement of mills and warehouses to accommodate the widely varying shipping orders, which frequently outclassed the "57 varieties."

The new types of wheat, developed in the effort to improve farm returns and obtain better milling results, required new designs of storage elevators, especially built for milling plants, with automatic conveyors and mixing equipment to draw a uniform and predetermined mixture of wheat for shipment to the mill, in accordance with the previous tests of the experimental mill.

Breakfast foods have been added to the line of mill products, with pancake flour, self-rising biscuit flour (which is made from an entirely different wheat than bread flour) with an infinite variety of wheat flours, varying with the demands of the trade, for bakers using elaborate and timed baking equipment, and for the housewife who goes by "feel." Flour is no longer just flour. It is a technical product.

There has been a radical change in packaging in recent years, which has required new equipment, new arrangement of old machines, and has even caused removal of plants to other locations. Flour is still sold and measured by the "barrel," the wooden container that holds 196 lb. net, but few wooden barrels are seen today. They have been displaced by cheaper packages that better fit the needs of the trade. Bakers like the 140-lb. jute or cotton sack, or the 98-lb. or half-barrel size. The housewife used to get the 49-lb. bag for her bread baking, but today the popular domestic package is the 24½-lb., in either cotton or paper. The apartment house dweller who buys flour only to thicken her soup prefers the 1- or 2-, or perhaps

Fig. 5—This 1,000-hp. slip-ring induction motor drives a 3,500-bbl. mill in Kansas City



the 5-lb. package. There is a growing use of cartons or packages in these smaller sizes.

With large-scale production and the increased cost of packaging due to the smaller sizes, special packing machines were developed and installed wherever the volume would warrant it. Hand sewing was displaced by use of sewing machines mounted on special frames to accommodate the flour sacks passing the head on a moving conveyor belt. Tying machines were built to close the paper sacks with either twine or wire. Special machines were installed for packages, cutting cardboard from a roll, making the containers, packing, sealing and labeling, all in one operation. Where this sort of equipment was installed, it frequently was arranged to centralize such a plant in a center where a variety of the products could be packed on a single group of expensive machines. Flour milling was one of the first lines of manufacture in the United States to develop and adopt the use of automatic handling of materials by the use of belt elevators and horizontal conveyors. Manual handling is reduced to the minimum and the product flows by gravity or is handled by equipment in a continuous stream. Conveyors have been used extensively for car loading.

Development of a line of new products gave the production man the opportunity to plan a new plant arrangement, to equalize load conditions for power and labor, and to reduce the share of fixed charges carried by each unit produced. Study of the costs shown by analysis and comparisons of plants proved the advantage of designing the buildings to fit the processes and especially the handling operations, from the raw material to the finished product loaded into cars or trucks. The various types of construction and the building materials used were fixed by weighing the convenience in operation, the maintenance, the insurance premiums, and the general safety.

Power is an item of importance in milling operations. A flour mill making 4,500 bbl. in 24 hours will require about 1,500 hp., varying with the design and the type of wheat being ground. Water

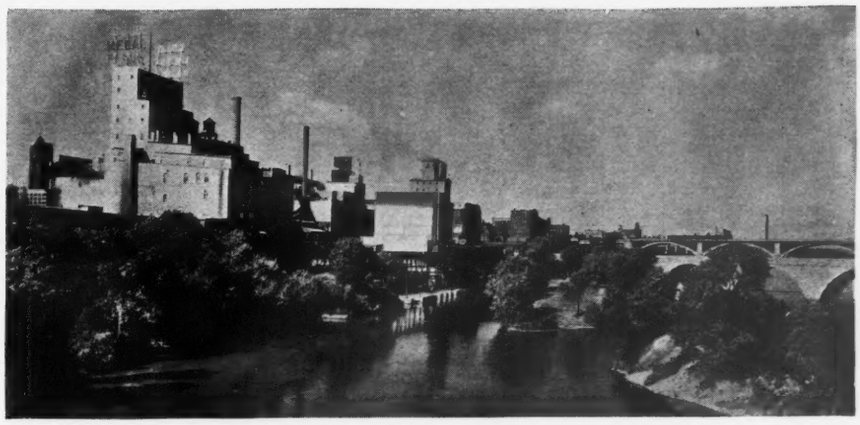


Fig. 4—From this view it is possible to see that a row of mills near the river in 1922 no longer exists in 1932. The way to reduce capacity is to reduce it!

power, which was so widely used in the early days, usually is seasonal, and had to be supplemented by steam power as milling operations grew to demand continuous operation. As changing conditions in the industry reduced the margin of profit, more and more study was given the cost of power. Improvements were made in both water and steam equipment. In recent years, the use of electric power by means of special motors adapted to the conditions of flour-mill operation has come into wide use, either from electricity produced in the plant or from purchased power. The diesel engine is coming into prominence in fields where oil is cheap and utility rates are higher than is adapted to the load conditions of the flour mill operating 24 hours per day. A saving of 1 or 2c. per barrel in the cost of power frequently is found in modernization of the older plants, and this represents a goodly share of the entire net profit to be earned these days.

Improvement in milling methods is one of the most outstanding results of the close analysis of costs and operating results. In the larger organizations, with several ambitious and progressive head millers it is possible to exchange ideas, to plan experiments, to check and compare results and, above all, to develop enthusiasm and technical pride. Under competent leadership, it has been shown that milling is no longer to be considered a rule-of-thumb operation but calls for scientific knowledge, accurate planning, and the measurement of results. This has resulted in improvement in mill flowsheets, with better facilities for meeting changing crop conditions. It has resulted in getting a larger percentage of high-quality flour from the wheat and producing flour that more uniformly meets the needs of the trade. When doing experimental work to determine the value of new varieties of wheat coming into the market or in checking the operation by means of the small unit, usually called the "experimental mill," it is possible to combine the experience and resources of the wheat man, the chemist, the baker and the miller to meet the needs of the sales department and the customer.

The control of sales and distribution of mill products is determined by the same intelligent analysis that has brought results in production. More profit can be made by selling less tonnage than formerly. The time-worn argument for selling below cost of the wheat plus the operating expense, just to "keep the mill running," has been found to be dangerous and to benefit no one permanently.

The description of the efforts made by the milling business to adapt itself to present conditions, with overcapacity and reduced consumption, could be amplified by many detailed illustrations and detailed figures. It may be illuminating, in these days of panaceas, with efforts being made on every hand to have "the government" fix everything and make it easy to survive without work, to consider what this industry has done. It may be encouraging to find that there is quite general recognition among millers that their worst problems can be met by intelligent study within the industry; that the problem of overcapacity and underconsumption can be met by more intelligent planning; and that the production man has a vital part to play in this matter of profitable distribution.

Getting Rid of Overcapacity

The normal daily operating capacity or output of the West Side milling district of Minneapolis was formerly *55,000* bbl. of wheat flour per 24 hours. This capacity does not include the East Side or other mills in Minneapolis, which have been reduced in capacity along similar lines. Present operating capacity of the West Side is 22,200 bbl. This is no longer all wheat flour, but part is semolina and part rye flour.

Present flour capacity is	16,700 bbl., or 30.4%	of former 55,000 bbl.
Present semolina capacity is	4,700 bbl., or 8.5%	of former 55,000 bbl.
Present rye capacity is	800 bbl., or 1.5%	of former 55,000 bbl.
Total all kinds	22,200 bbl., or 40.4%	of former 55,000 bbl.

Reduction in capacity by mills demolished on West Side only, 32,800 bbl., or 59.6 per cent, practically 60 per cent of the former normal capacity of 55,000 bbl.

Gorton-Pew Builds Complete New Plant for Codfish Cakes

By THOMAS J. CARROLL
President, Gorton-Pew Fisheries Co.
Gloucester, Mass.

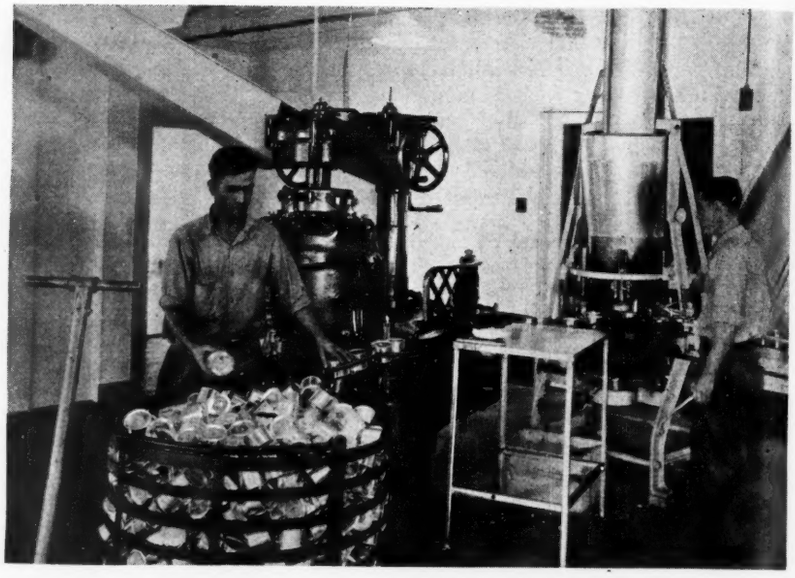


Fig. 1 (top)—Two slow-speed canning lines have been consolidated into one high-speed line, operating at 120 cans per minute

Fig. 2 (below)—Peeled potatoes come up from the peelers into the hopper at the left and are distributed in fiber buckets to the "de-eyers." Under the merry-go-round is a pan into which the eyes fall. A moving brush sweeps them to a disposal chute

MANY FACTORS entered into our decision to build a new canning department in 1932 for the production of Ready-to-Fry Codfish Cakes. Material and machinery costs were very low; we had a crew of skilled mechanics and millwrights who could do nearly all of the work and it was decidedly to our advantage to keep as much of our organization intact as possible; we had a growing volume of business in this product that warranted devoting an entire plant to its production; and, lastly, we wanted a plant that, in keeping with the quality of the product, would be an added attraction to the many thousands of vacationers who spend their summers on Cape Ann.

Although reduced costs are naturally a good reason for modernizing an establishment, our decision was based on the broader principle that we would soon need a larger plant, and the probabilities were that it would cost considerably more to build in the future than it would in 1932. At the present moment, we have not yet accumulated sufficient operating data to determine how much the new investment will earn, but the indications are that it will closely approximae our estimate.

In the old plant there were two slow-speed canning lines, while in the new plant these have been consolidated into one high-speed line (Fig. 1). This line is not operated today at top speed but can run 25 per cent faster when higher production is needed. Potatoes were formerly handled by baskets, but in the new plant they are handled entirely by flight conveyors after they have been dumped into the mechanical peelers. The problem of waste disposal in the operation of "de-eyeing" the potatoes, which existed in the old plant, has been solved by building a pan around the merry-go-round (Fig. 2) just under the working space, with brushes projecting from the traveling table to sweep the trimmings into a disposal chute. This has contributed much to the neat appearance of a show plant.

To avoid any possible discoloration that would result from contact of potatoes with iron or steel surfaces, the metals chosen in fabrication of the new equipment are aluminum and stainless steel as far as possible. Hoppers or grinders or cutters were replaced with the latter, while cooking kettles and their baskets were made from aluminum (see Figs. 3 and 6).

An important factor in our modernization campaign was the proximity of the plant to a public utility plant belonging to the New England Power Association, most of the subsidiaries of which derive their electrical energy from hydro-electric plants in the distant mountains yet must maintain steam up in their local steam-driven generating stations in order to be ready to operate at

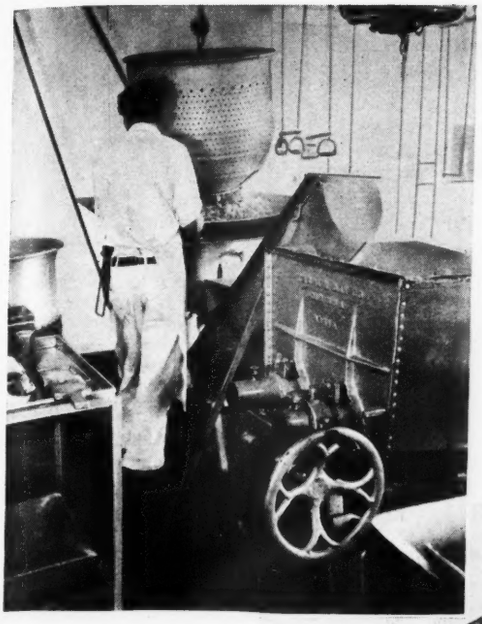


Fig. 3—Potatoes and codfish are cooked together in these bottom-dumping aluminum baskets, then ground and mixed. Non-ferrous metals are used in contact with potatoes

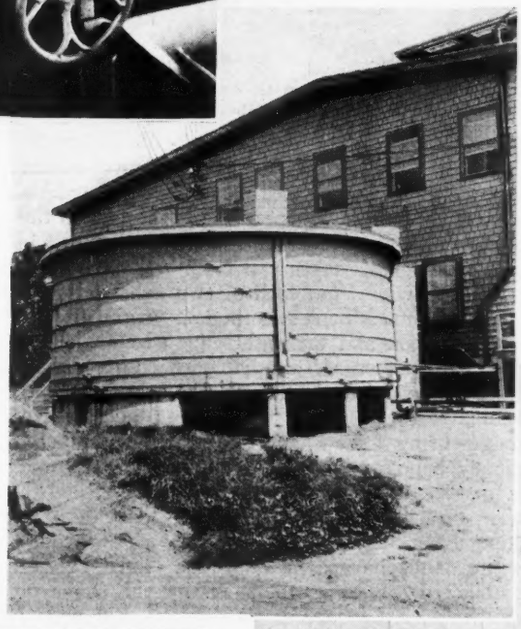


Fig. 4—This water tank is a heat exchanger whereby cold sea water takes up the heat from hot fresh water from the cooling tank in Fig. 5, thereby saving considerable cost of fresh water

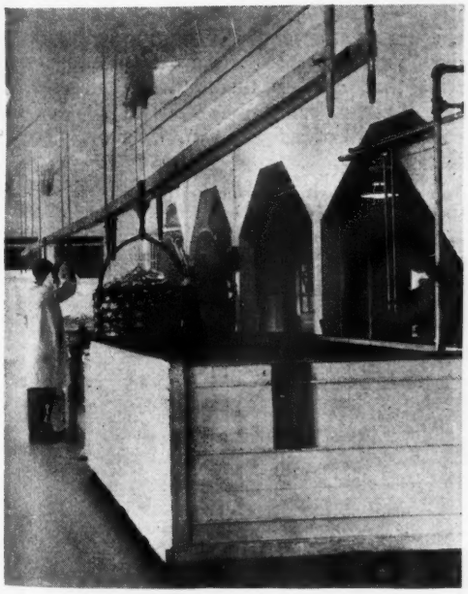


Fig. 5—Interior of plant is finished in white enamel. After processing, the crates of cans are lifted by a hoist to the tank of cold fresh water in the foreground

Fig. 6—Cooking the Ready-to-Fry Codfish Cakes in aluminum kettles. An electric hoist does all the heavy work

a moment's notice. We are able to purchase our live-steam requirements from them at 175-lb. pressure at a cost that is roughly equivalent to the wages ordinarily paid to a fireman, although at another of our plants in Gloucester we are selling live steam to other concerns on much the same basis. In both cases, however, the arrangement makes for economy of operation.

Another economy is found in the reduced cost of fresh water for cooling the cans in the tank shown in Fig. 5, by using a large tank equipped with pipe coils to act as a heat exchanger (shown in Fig. 4) by means of which we can use the same cooling water over and over again but remove the heat by means of cold sea water. The latter must not come in contact with cans, on account of the corrosive quality of salt.

In developing the design of the new plant we have drawn upon other industries for equipment that is adaptable to our needs. From the sauerkraut industry came our potato slicer; from the fruit canning industry came the merry-go-round; from the baking industry came the mixer; and from the meat-packing industry came the meat grinder.

The method of cooking the potatoes and fish together in an aluminum basket was developed by our own engineers.

The new canning plant is operating at a slightly lower volume during the summer than the maximum capacity of the old one, and from present indications, it is operating at a lower cost. However, it will be stepped up in volume when demand increases in the fall and winter, at which time maximum consumption of Ready-to-Fry Codfish Cakes occurs.

New Method of Making Ice Cream Solves Many Problems

By CLARENCE W. VOGT
President, Vogt Instant Freezers, Inc.
New York, N. Y.

Putting 2½-gal. packages of individual-service ice cream in cabinet

Removing and dispensing, with one hand, an individual-service portion

FOR the first time in history, an ice cream manufacturer is in a position to insure to his dealers accurate cost and profit control. Heretofore only a dream, such control has been made an accomplished fact by a new product manufactured by new methods. It involves ice cream in individual-service portions, cylindrical in form and wrapped in paper. As now being produced, the unit is about 2 in. in diameter and 1¾ in. high. The process of manufacturing it includes methods of freezing and packaging that eliminate shrinkage; that improve the quality; that impede the "bootlegger"; and that add sales appeal to the product.

In the new process, air is incorporated into the mix before it is frozen—a desirable, although not essential, accomplishment; and the cream leaves the freezer in a stiff, moldable condition rather than with a "soupy" consistency. The freezer used is, broadly, a new adaptation of the Vogt continuous freezer. The cycle of operations taking the mix from the tank to the freezer is entirely new. Leaving the tank at 40 deg. F., the mix is pumped through a precooler that reduces the temperature to the freezing point. From the precooler it passes to a triplex reciprocating pump which may be operated at a pressure of 200 lb. per square inch, or even higher. This pump discharges the mix, with the air to be incorporated, to a dispersing mechanism which emulsifies and disperses the fluids and causes air to be dissolved in the mix before it goes to the freezer. The system maintains the high pressure during freezing until the mix is stiff, when the ice cream is ready to be molded and wrapped. It is the great quantity of moisture frozen in the mix that makes the ice cream sufficiently stiff to be form-retaining.

At this point, packaging begins. In the first step, a continuous paper tube is formed to receive the ice cream. The machine for doing this takes paper ribbons about 4 in. wide from each of two large rolls. The machine scores the left edge of one ribbon and the right edge of the other, and passes the ribbons through a die to form them into two overlapping sections of a tube, the scored edges being folded back to form diametrically opposite tabs. Extending through the die to a point just within the newly formed paper tube is a conduit leading from the freezer. Through it, ice cream is discharged into the tube under sufficient pressure to pack it firmly.

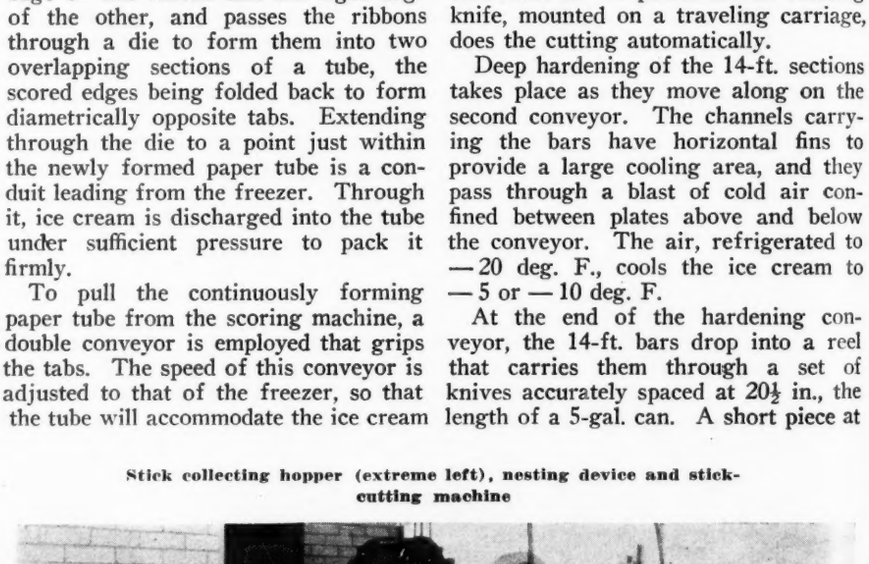
To pull the continuously forming paper tube from the scoring machine, a double conveyor is employed that grips the tabs. The speed of this conveyor is adjusted to that of the freezer, so that the tube will accommodate the ice cream discharged but will maintain sufficient back pressure for firm packing. This pressure, and hence the quantity of overrun, also is controlled by a compensator in the freezer discharge pipe.

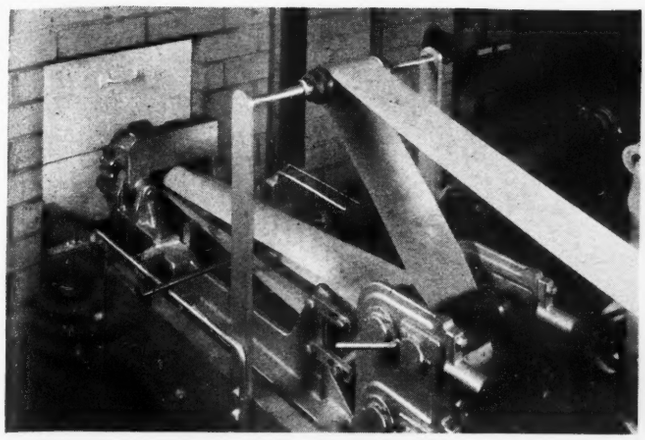
The conveyor is located in the hardening room, the tube reaching it through an opening in the wall. It is inclosed, and as the continuous bar travels the 20-ft. length of the inclosure, which requires about 30 seconds, the cold air case-hardens the ice cream and freezes it fast to the paper. At the end of the conveyor, 14-ft. lengths are cut from the bar and dropped into semicircular channels on a conveyor traveling at right angles to the first and synchronized with it. A power-driven rotating knife, mounted on a traveling carriage, does the cutting automatically.

Deep hardening of the 14-ft. sections takes place as they move along on the second conveyor. The channels carrying the bars have horizontal fins to provide a large cooling area, and they pass through a blast of cold air confined between plates above and below the conveyor. The air, refrigerated to —20 deg. F., cools the ice cream to —5 or —10 deg. F.

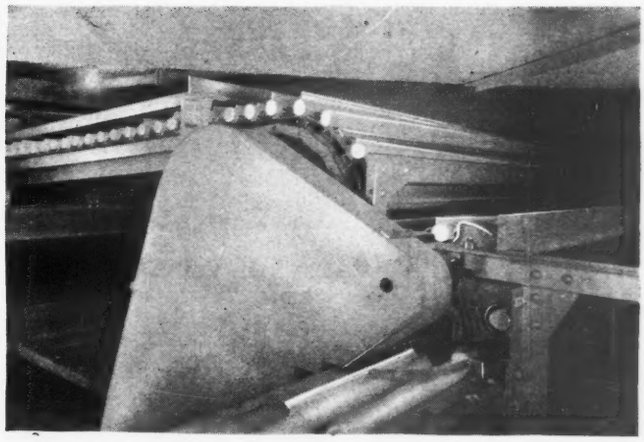
At the end of the hardening conveyor, the 14-ft. bars drop into a reel that carries them through a set of knives accurately spaced at 20½ in., the length of a 5-gal. can. A short piece at

Stick collecting hopper (extreme left), nesting device and stick-cutting machine





Machine which forms and fills the continuous paper tube



Deep-hardening conveyor, cutting reel and stick conveyor

each end of the 14-ft. bar is thrown aside and reprocessed, since the ends may not be clean-cut when the bar is severed with its interior in a non-hardened condition. The 20½-in. "sticks" fall two abreast onto a belt conveyor that takes them through the hardening-room wall to a stick-collecting hopper near the receiving end of a cutting and packaging machine.

An operator inspects the sticks as he takes them from the hopper to place them in a nesting device that determines the shape and size of the final package; the package used in the plant described is hexagonal and contains nineteen sticks. This nesting mechanism comprises three arms and it operates on the principle of the pantograph, being adjustable for packages of different sizes. Two oval-shaped vertical racks support the nester and provide a circuit that lowers it when it moves forward from the loading position and raises it at the opposite end of the orbit.

In the next step, the sticks are transferred to the holder of the cutting machine. This holder comprises twelve hexagonal arms, the upper halves of which may be opened back to admit the charge. With the holder open, the nester is pushed forward, depositing its load as its arms pass downward between those of the holder. Then the holder is closed and power applied to pull it through a cutting head where twelve reciprocating knives cut the sticks into individual-service portions.

The cutting machine is equipped with a pair of the stick holders, one at each end of an arm that pivots at its center and is supported on the main frame; a motor mounted on this arm drives a screw that pulls the sticks through the cutting head. The pivotal mounting permits the holder, with its 5 gal. of unit portions to swing through 180 deg. to the point where final packaging takes place, at the same time bringing the other holder into a filling and cutting position.

In packaging, the arms of the holder are moved apart axially by a crank, and into the ¼-in. space opened up between layers by this movement, operators insert sheets of paper. Then the spaces are closed, the holder is rotated to a vertical position, and the lower six layers are deposited on a stand, being set on the hexagonal bottom of a pasteboard carton in the "flat." A girl then pulls up the sides of the flat, forms them to fit the hexagonal stack of cylinders and staples the loose sections to the bottom piece. Next, she covers the top layer with paper, wraps the whole package with a trademarked paper jacket, and attaches a metal handle. The package is then ready for the dealer or the storage room.

Dealers put two of the packages in each of the 5-gal. compartments of their cabinets. To serve, dispensers catch the tabs of a cylinder between the fingers and deftly remove the wrapper. To gain access to the cylinders, the paper is pulled back as the servings are required. Thus, no moisture can collect on the ice cream to form ice crystals. Furthermore, no water drips from dippers to form hard particles in the servings. And, even more important, the texture of the ice cream is not altered by "working" with dippers. So the original quality of the individual-service ice cream is maintained. This quality includes richness in flavor, firmness, smoothness, close texture and fine cell structure. These characteristics result from freezing a high percentage of the moisture before the ice cream begins to still-harden and from incorporating air before the mix is frozen. The latter gives a better structure for the same overrun than methods of freezing in which the air is "whipped" into the product after or during the freezing period.

The consumer appeal of the new ice cream lies in the fact that it is sanitary and appetizing; that it insures uniformity in quality and provides protection from inferior bootlegged ice cream; and that it may be served in a condition that is neither hard nor frigid, making it easy to spoon and palatable.

With individual-service portions, dealers find they escape the loss from shrinkage that occurs in handling ice cream in bulk. And they experience additional economy in cabinet refrigeration, since the packaged ice cream is kept at +15 deg. F., as compared to +5 deg. F. for the bulk product.

The manufacturer also profits from the absence of shrinkage. He can sell the product for a better volume-for-volume price than he can get for bulk ice cream, and that with a direct labor cost of less than two cents per gallon and total costs comparable to those for the bulk product when the return and washing of cans are considered. Besides, the legal manufacturer is protected from the bootlegger by having every nickel's worth of his product trademarked.

The basic inventions involved in the new process were conceived by the author. The form and size of the individual-service portion were selected and the merchandising plan agreed upon jointly by him and a Borden committee headed by R. V. Jones, regional chairman, and appointed by Gus. G. Kindervater, general manager of the ice cream division of the Borden Co. The first installation for the production of the individual-service portions, trademarked MelOrol, was completed last June at Borden's Dexter Ave. plant, Detroit, under the supervision of Vogt Instant Freezers, Inc.

While there have been in the past sporadic attempts at such an accomplishment, none of them, it would seem, solved the complete problem, which includes low package and production costs; rapid, convenient and foolproof dispensing; increased sanitation; and uniformity of product.

The freezing process used in making MelOrol is not limited to that particular product. Plans are under way for applying it to other frozen confections, since specialties of any reasonable shape can be formed without molds by freezing the product stiff and then extruding it.

A New Plant

Yet It Needed Modernizing

By S. H. COLEMAN
Chief Engineer, Reid, Murdoch & Co.
Rochester, Minn.

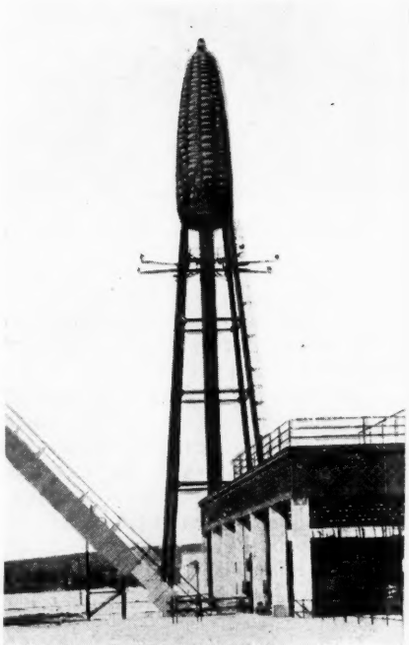
TWO years after it was built, the steam plant of the new Rochester (Minn.) plant of Reid, Murdoch & Co. was renovated to correct and eliminate a number of problems. This plant is one of the largest vegetable canneries in the world, with a capacity of over 500,000 cases annually of peas and corn.

In 1929, when the plant was first built, the original boiler equipment consisted of a single 300-hp., two-drum, bent-tube boiler equipped for hand firing. It had a closed-type feed-water heater. The installation, which was inadequate for the steam demand, produced excessive smoke and carryover, or priming. In the second year, two stoker-fired 160-hp. boilers were installed, and a mechanical stoker was added to the 300-hp. unit. Continued difficulty from carryover of water was experienced, causing whitening of the cans in the cooking retorts and necessitating further installations of steam separators, feed-water regulators, and continuous blow-down equipment to avoid too high a concentration of solids in the boiler water. These moves solved the problem of adequacy of steam production and priming, but in 1931 further modernization was carried out.

To eliminate corrosion in the boilers and steam piping and to obtain better heat economy, the old closed-type water heater was removed and replaced by a Hoppes de-aerating heater. An automatic combustion control apparatus was installed to eliminate pressure surges under fluctuating loads. By these improvements, practically all the enumerated difficulties were eliminated and reliability of service was insured. To make this modernization program a profitable investment it required careful balancing of necessities and limitations. The steam demand, as shown by the flow-meter chart, is of a highly fluctuating character (see Fig. 1). It is impossible to control this load by balancing conditions in the plant because of the uneven flow of vegetables from the fields to the process. Yet, due to the short operating season of not more than three months, extreme refinement of equipment is limited by the high cost of the improvements.

On the other hand, these limitations must be balanced against the fact that absolute reliability is essential, for any shutdown results in losses made disproportionately great by the extreme shortness of the operating season.

In addition to the factor of reliability, consideration must be given to the quality of the steam. Its condition not only must be constant but, because a certain amount of cooking is done with



Built to resemble a huge ear of corn, the water tank maintains a pressure of 50 lb. on factory water mains. It is floodlighted at night

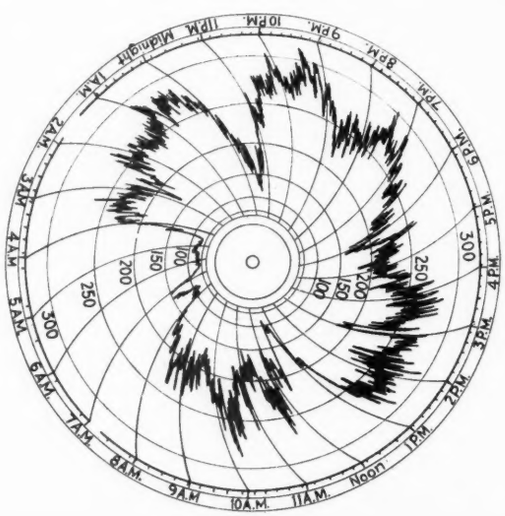
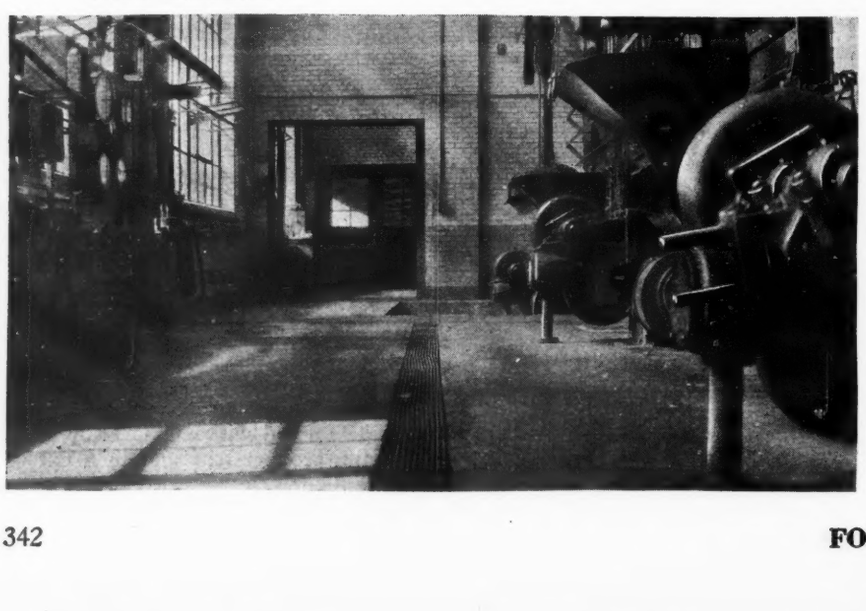
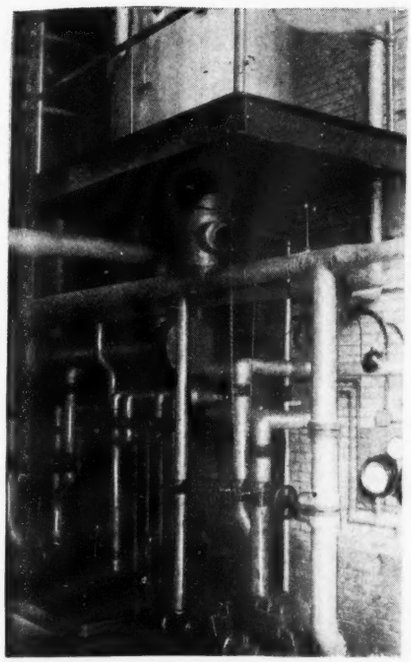


Fig. 1—Extreme fluctuations in process-steam demand create a difficult problem in maintaining proper quality of steam. Note the size of the load after midnight

The boiler room and its control instruments





Feed-water heater of de-aerating type, located directly above feed pumps

smaller units carries the load. Each boiler is fired by a Detroit stoker, capable of maintaining a continuous rating of 150 per cent, with a maximum rating of 200 per cent. These stokers are driven by variable-speed motors.

Combustion control is accomplished by a Ruggles-Klingerman step-action regulator connected by a system of cables and shaftings to the stoker motor controllers and to the uptake dampers of the several units. With this equipment, steam pressure is maintained at a constant value and furnace draft conditions are kept within reasonable limits. The regulator is mounted on a master control board that centralizes all boiler-room control switches and instruments.

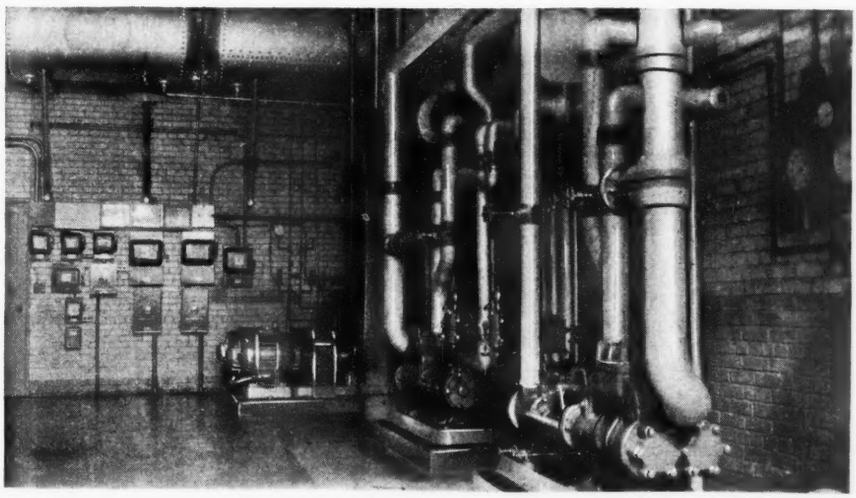
The use of instruments has been kept at a minimum. A Brown Instrument Co. flow meter that measures totai evaporation, a Republic CO_2 recorder arranged for use on any of the three boilers, a flue-gas temperature recorder, a feed-water temperature recorder, a pressure recorder, all by Brown company, and indicating gages on the steam pressure, boiler feed-water pressure and domestic water pressure comprise the instruments. This arrangement of equipment and control permits an over-all boiler efficiency of 72 per cent, including banking losses during the packing season.

Water for the boilers and general use throughout the plant is supplied from a deep well, being pumped into the plant water system by a motor-driven Pomona deep-well turbine with a capacity of 1,000 gal. per minute. Superimposed on the water system is a 50,000-gal. storage tank which has the unique distinction of being built in the form of a huge ear of corn, symbolic of one of the two principal products of the plant. This tank maintains a constant head of 50 lb. on the system. Water from the boiler is taken from the plant main, with provision for emergency use of the municipal supply.

Two Permutit water softeners, each having a capacity of 80 gal. per minute, are installed in the plant. This equipment is available during half of the canning season for treating boiler water. During the other half of the season, softened water is used in process work and is not available for boiler use. During this period, internal treatment of boiler water is accomplished by the injection of sodium aluminate and sodium carbonate into the boiler feed lines.

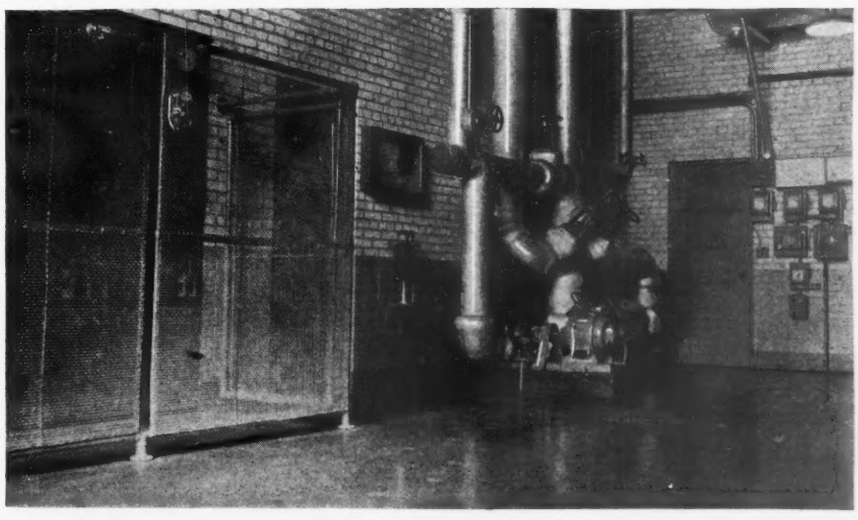
Concentration of dissolved and suspended solids in the boilers is kept low enough to avoid the possibility of carryover by a combination flash and heat exchanger type continuous blow-down unit made by National Aluminate Co. The discharge from the steam purifiers in the boiler room is piped to the flash chamber of this machine. Heating the feed water is accomplished by the exhaust from the boiler feed pumps, blow-down flash, and a small percentage of make-up steam supplied through a Fisher reducing valve.

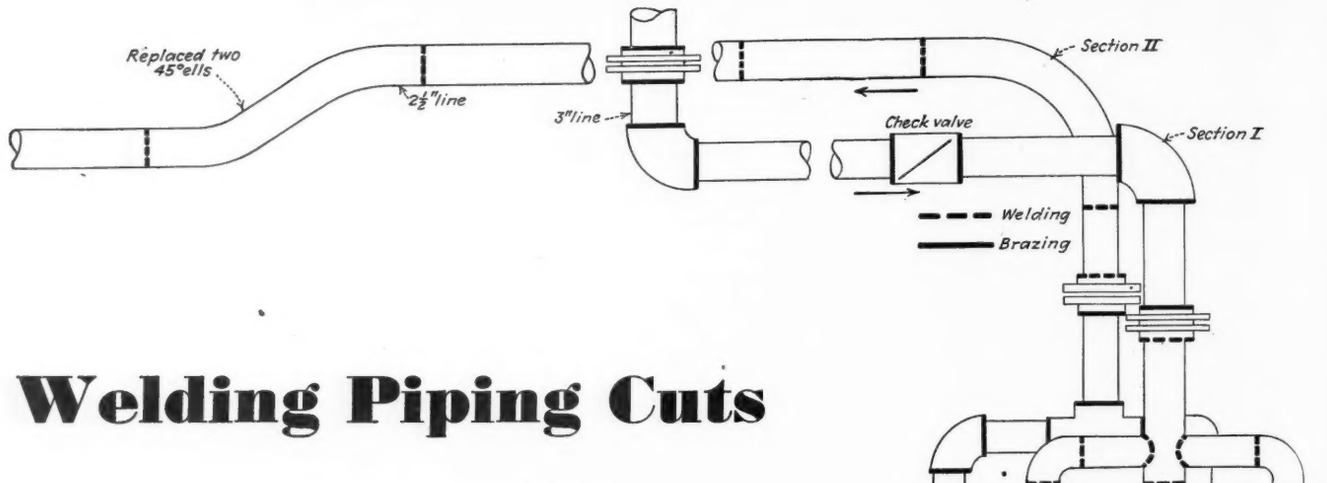
This carefully thought out modernization of the steam plant has resulted in elimination of practically all of the problems that were found when the plant was first built.



Above: Air compressors and boiler feed pumps are located in a separate room. Below: Pumps are an important feature of any food plant. Note how the switchboard is protected for safety by a screen

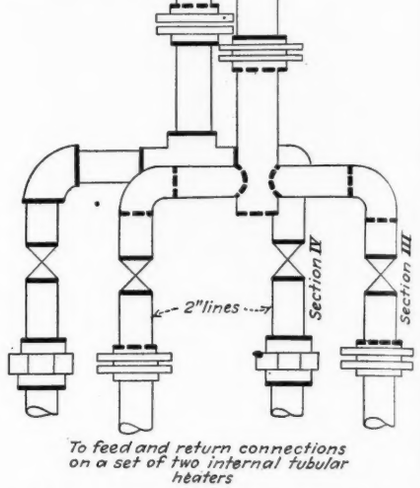
live steam, it must be free of impurity. As a result of the need of meeting these conditions in an economic manner, the three boilers, designed for a 175-lb. working pressure, are equipped with Cochrane steam purifiers and dischargers, Reliance high- and low-water alarm columns, Consolidated safety valves, Vulcan soot blowers, and Swartwout feed-water regulators. During the packing season, all of these units are in operation and a pressure of 140 lb. is maintained in the factory mains. This pressure is reduced through Fisher reducing valves to process pressure at the individual sections of the plant. During the winter season, when steam is needed only for heating, the boiler pressure is only 35 lb. and one of the





Welding Piping Cuts Maintenance Costs

By R. B. WOLF
Dairy Delivery Co.
San Francisco, Calif.



To feed and return connections on a set of two internal tubular heaters

Original standard weight pipe with galvanized fittings and screwbonnet unions was replaced with extra heavy steel pipe with brazed galvanized fittings (Sec. I and IV), long sweep bends and welded steel flanges (Sec. II), and welded ells and brazed brass gate valves (Sec. III).

FIVE YEARS experience with piping in a dairy plant has shown that an all-welded line is economy where permanency is desired. This is true even though the initial cost of extra heavy pipe is greater than standard weight pipe, even though sweep bends are more expensive than threaded fittings, and even though the cost of installation is greater.

Such economy is possible because in the processing of food products, such as sterilizing of milk, the equipment generally is composed of a variety of metals. Let us take for example tubular apparatus of the double-pipe or of the multiple-tube, multiple-pass types. It may have steel, iron, brass, or copper tubes with iron or brass heads for hot or cold water or brine. For conveying the milk, nickel or tinned copper tubes may be used. Piping to and from the processing equipment and the tanks for hot water, cold water, and brine usually are of standard weight steel pipe with threaded connections, malleable fittings, and cast-iron or brass valves. The pumping equipment for the most part is made of cast iron; frequently with brass-mounted pumps.

This array of metals, often aggravated by small quantities of brine which may find its way into the hot-water circulating system, sets up a favorable condition for corrosion and electrolytic action. As a result in some plants, pipe replacement is a major activity of the maintenance department and a great expense to the management.

The circulating system in the particular plant to which I refer had about 200 ft. of 3-in. pipe for conveying water heated to 146 deg. F. Although the line was made up of standard weight pipe and fittings, it developed leaks every three or four months at the threaded connections. We finally concluded that it was necessary to get away from threaded joints and fittings, if possible, as the wall thickness of standard pipe is much reduced when threaded.

One section of the return line was replaced with extra heavy pipe to which the malleable fittings and brass valves were brazed after the threaded connections were made up. Satisfactory results encouraged further replacements. The last replacement, made three years ago on a long section of the line, was made up of extra heavy pipe, long sweep bends, and butt-welded connections. All fittings, except flange connections to the pump and to the header, were eliminated. The brass valves were screwed up and then brazed to the pipe. This installation has since been in constant service without any signs of leaking.

In several cases much trouble was had with brine piping immediately adjacent to non-ferrous coolers. Fittings, especially close nipples and bushings, would fail as frequently as once a month; the wall thickness on these fittings (1-in. and 1¼-in. size) was very little. The trouble was the result of corrosion caused by oxidation which, due to plant layout and necessary plant operation, could not be remedied. This piping was of a complex design and difficult to repair, but by installing brass nipples and fittings up to the main headers no further difficulty has been encountered from this source after a year and a half of daily service.

Brine coils, which are used for cooling rooms and are subject to alternate frosting and thawing action, develop leaks around the threaded connections long before the rest of the coil is in bad shape. This action is mostly due to rust and corrosion from the outside and affects first the threaded portion of the pipe. The natural protection of mill scale or galvanizing is removed when the pipe is threaded. Even with the protection of a paint preparation, this part of the coil is subject to failure first. We had several sets of brine coils in cold-room bunkers which developed bad leaks at the union connections and at couplings. The defective parts were cut out about three inches back from the threads, short sections of pipe were welded in place, and the life of the coils has been greatly extended.

In some cases where extra heavy pipe lines with screwed fittings have failed, all-welded lines of standard weight black pipe have given excellent service, mainly because the wall thickness at the joints has been increased rather than decreased, as is the case in a threaded connection.

The cost of installing welded lines has been lessened as welded fittings have become easily obtainable and as modern plants have purchased welding equipment for other uses.

Continuous Cooking Method Improves Quality of Noodles

FRYING of noodles, potato chips and similar products in deep fat or oil has traditionally been a batch operation. It is carried out by lowering open-mesh baskets or trays containing the material to be cooked into vats or kettles of highly refined corn, coconut, or cottonseed oil heated to approximately 350 deg. F. and leaving them there until the contents are judged to be cooked.

Regardless of precautions, the temperature of the oil falls precipitously as the kettle is charged, and very little cooking takes place until the temperature of the oil again has risen to approximately 300 deg. F. The temperature to which the oil falls depends upon the relative quantity and the temperature of the material charged into the kettle of heated oil. During this lag period moisture and, in the case of leavened products, much of the leavening gas are driven from the material being cooked and are largely replaced with oil.

Not only is the finished product rendered unappetizing and unnecessarily expensive by the excess oil it has absorbed but it is very likely to be unevenly cooked because the portions of the batch nearest the bottom and outer edges of the tray or basket will reach cooking temperature quicker than the rest of the batch. This means that when the finished batch is removed from the cooking kettle either the outer portions of the batch will be overcooked or the interior portion will be undercooked. These results are obtained under batch cooking conditions in deep fat regardless of whether the material is doughnut or noodle doughs, potato slices or nuts. Alert doughnut bakers early recognized the handicap that was thus put on their product and made the necessary changes in their cooking operations to overcome the unsatisfactory conditions and results.

Cookers of noodles and potato chips and roasters of nuts have not had the defects of their products so forcefully impressed upon their consciousness and in the main are content to adhere to the batch method of deep-fat cooking and roasting. However, the LaChoy Food Products, Inc., Detroit, Mich., is one of the exceptions. It realized that its chow mein noodles, which were being cooked by the batch method at the rate of 60 lb. per hour, were not of the desired quality and that their cost of production was too high.

These objectionable and unprofitable factors were eliminated by the installation of a continuous method of cooking under controlled time and temperature conditions. In addition to the controlled cooking conditions this continuous method made possible a production of 250 lb. per hour with savings of 40 per cent in labor cost, 30 per cent in cooking oil used, and 50 per cent in fuel for heating purposes.

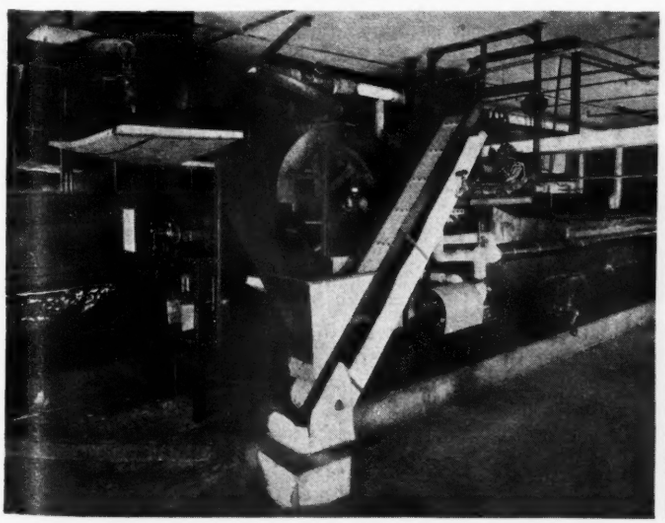
The cooking equipment consists of a Sandvik steel belt 24 in. wide mounted so that the drive and take-up pulleys are 35 ft. apart from center to center and the upper span of the belt is made to pass through a 20-ft. tank of hot vegetable oil at a controlled speed which can be made to vary from 2 to 8 ft. per minute. Snub rollers hold the belt in a submerged horizontal position until it nears the discharge end, where it takes an inclined direction to raise the cooked noodles from the cooking vat and drain them free from excess oil before they are automatically discharged upon a belt conveyor which takes them to the packing department.

From the time the uncooked noodles are automatically delivered to the cooking belt by a fabric belt conveyor from the sheeting and cutting machines until they are delivered fully cooked and drained free from excess oil, an overhead traveling chain with relatively short fingered rakes holds the noodles in place on the belt and makes certain that they keep submerged in the heated oil the desired length of time for thorough and uniform cooking.

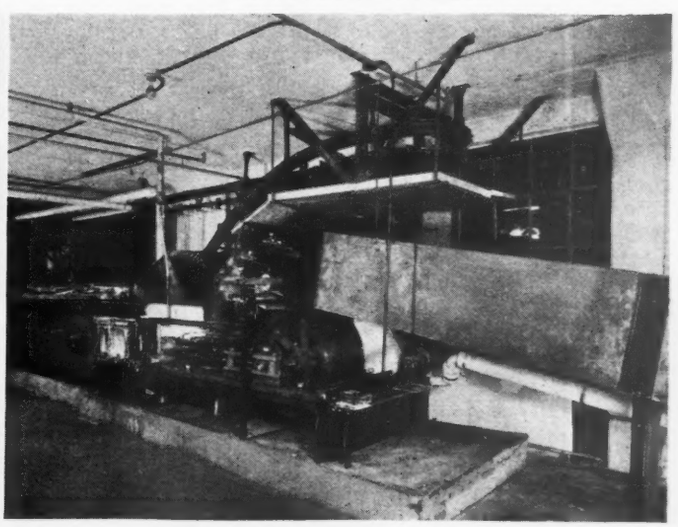
Steel skirts along each edge of the steel belt for the length of the cooking vat prevent any of the noodles from falling off along the sides and remaining in the heated oil to char and otherwise deteriorate the color and flavor of the oil. Cooking oil which has been thus deteriorated gives an objectionable flavor to subsequent noodles cooked in it. Also these noodles are likely to become stale or rancid tasting much quicker than those cooked in undeteriorated oil.

As the steel belt passes over the discharge pulley and under the cooking vat on its way to the feed end of the unit it is automatically freed from any adhering noodles and oil to prevent the development of rancidity and burnt odor or flavor.

Excess oil is drained from cooked noodles before they are discharged from steel belt

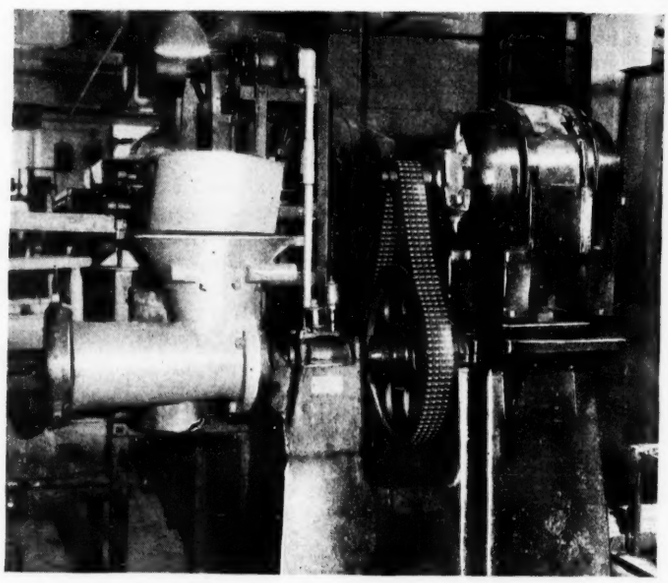


Overhead chain with rakes holds noodles on submerged steel belt during cooking



Chain Drive Reduces Cost of Grinding Figs in Bakery

By FRANCIS A. WESTBROOK
Mechanical Engineer
Center Conway, N. H.



Chain drive replaced gears which wore out quickly and were the source of unnecessary noise

THE experienced factory manager knows that it is not the big things that require constant attention and supervision. The big problems, by their very size and prominence, have a way of focusing attention and in this manner help work out their own solutions. They get recognition in the front office.

Rather, it is the many small and seemingly unimportant details, the traditional irregularities and mishaps which are generally taken as a matter of course, that test the effectiveness of the factory management. They have to be sought out and quite likely will be found in unexpected places. In these days of cutting corners on production costs, successful factory operation demands reduction to the minimum of time lost because of shutdowns, no matter how brief in duration, due to mechanical failures of every kind.

Also elimination of all unnecessary noise and vibration is not to be overlooked, especially when associated with the wearing parts on high-speed machinery. In fact, no operating detail is so insignificant that it can be overlooked if standardized production schedules are to be maintained. Sometimes only a relatively small change in the coordinated working parts of a unit converts a high-cost operation into a less expensive and less annoying one.

In the New York plant of a nationally known bakery organization is an example of how the operation of a fig grinder has been greatly improved by replacing driving gears with a chain drive of the inverted-tooth type.

The gears gave rise to excessive noise, caused much vibration, and wore out quickly. The chain drive, which has now been in use for more than three years, is practically noiseless and without vibration, is still in good condition, and shows promise for a considerably longer period of good service. When it eventually does become so worn that it no longer meshes properly, only replacement of the chain—not the sprockets—is all that will be necessary to restore the drive to its original good condition.

The chain, shown in the accompanying illustration, is a quadruple strand having rollers 0.400 in. in diameter by $\frac{3}{8}$ in. wide. It is driven by a 20-hp. a.c. motor at 1740 r.p.m. which runs 9 hours per day and is subject to frequent peak loads.

The driving sprocket has seventeen teeth, is of S.A.E. 1020 steel, and is carburized, quenched, and then drawn to 35-45 C. Rockwell in order to present tough, high-carbon, wear-resistant surfaces to the chain rollers; surfaces which are hard and less resistant to wear would result if the drawing operation were omitted. The follower has 96 teeth, is of cast iron, and, of course, the teeth are cut.

These sprocket specifications are typical of those applying to a majority of electric motor drives. For very intermittent services the carburizing of the driver might be omitted. On the other hand, for continuous service the carburizing provides approximate equality of wear for the lesser number of driver teeth, which is the condition so successfully met in this application. For slower speed drives it would be proper to use cast iron or steel, noncarburized, for either driving sprocket or follower.

The center distance of the installation shown in the illustration is $18\frac{3}{4}$ in. and is vertical. When the gear drive was replaced, spacers were put under the motor to increase the center distance. This is not always necessary, as gear drives are often replaced by chains without alteration of the centers and provide the same or larger ratios. The vertical center distance might be looked upon as violating good practice according to the recommendations of some authorities. The performance of this unit has shown that vertical center distances are not necessarily to be avoided if adjustment can be provided. Shims are used to increase the center distance at considerable intervals of time when required by the slow normal increase in chain pitch as wear takes place.

Good lubrication, naturally, has contributed much to the performance of this drive. Without it, or with incorrect lubrication, the chain life and sprocket life would have been decreased just as would any other positive power-transmission equipment.

The Peekskill (N. Y.) plant of Fleischmann Co. represents more than 30 years development in yeast culture.

Standard Brands Modernizes Yeast Plant at Peekskill

PRODUCTION of yeast, the commodity leavening agent for the baking trade—in distinction from yeast the biological entity—is to be advanced in the near future. While many years of research has developed a yeast that is of remarkable biologic purity and has given us specially selected strains of yeast developed to a high degree of leavening efficiency, 1932 will mark another step in the production of bulk, pure-culture yeast under economically, as well as technically, controlled conditions.

The standards for yeast produced under these latest developed conditions are so exacting that the yeast will be of a higher biological purity than the accepted standards for good drinking water and the production cost will be at a level to meet successfully the competition of the present, at least.

Production of this quality of yeast involves an industrial technique that is almost 100 per cent pure culture fermentation and requires equipment and methods equivalent to laboratory grade of precision. Also it requires a new plant and new equipment to accomplish the end. The year 1932 with its low costs—particularly of copper—is propitious for a complete modernization of the Peekskill yeast plant. A new building, 65x130 ft., is now being constructed to house the new equipment. Like the new plant of the Simonds Saw Co., at Fitchburg, Mass., it will be windowless and supplied with conditioned air. It has fully tiled walls and floors and indirect lighting. Production of bacteria-free yeast necessitates that all air used in and around the fermenters shall be bacteria- and dust-free. Conditioned air to the extent of between 60,000,000 and 80,000,000 cu.ft. per 24 hours will be used, which is the equivalent of 12,000 cu.ft. of air per minute per fermenter.

In the present-day method of producing yeast, air is blown into the fermenting mass in the fermenters and the alcohol formation that would normally result from the growth of the yeast is completely avoided, thereby utilizing the mash completely without the production of the intermediate product, ethyl alcohol. Also it eliminates all of the technico-legal restrictions attendant upon the production of alcohol, which are vexatious, to say the least.

Blowing air through the mash merely permits the yeast to oxidize the alcohol completely by furnishing it with a generous supply of oxygen. But the oxidation liberates a large amount of heat which must be removed or the temperature of the mash will rise to a point where the yeast will be injured. This means that the fermenting mash must be cooled, which at Peekskill is accomplished by circulating water from the adjacent Hudson River through cooling coils in the fermenters and by spraying water on the outsides of the tanks. The amount of refrigeration thus supplied is equivalent to an average of 500 tons per fermenter, although in extremely warm weather the amount may be equivalent to 1,000 tons of refrigeration.

The new fermenters are five times the size of the old fermenters and are so designed that one man may manage the same number of the new fermenters as of the smaller old ones. For their fabrication, 500,000 lb. of copper was purchased at the recent low prices for this metal, which makes a very substantial economy in the modernization program.

In a modernized plant, yeast production will be at the rate of 3,000 lb. per hour per fermenter and will require approximately the same weight of nutritive materials to supply the food for growth of the yeast. A better quality of leavening agent will be produced and at a lower unit cost than before, thus making the modernization a good investment.

Only Four Years Old,

But It Was Profitable to Modernize

By GEORGE V. KLIMES
President, Alabama Vinegar Co.
Birmingham, Ala.

Modernizing a Unit Operation

Here is a company that knew what it needed in order to obtain consumer acceptance, and went after it. In converting a gas-fired water heater into a pasteurizer it departed from traditional methods. Manufacturing costs were slightly increased but sales resistance was materially lessened through securing rapid turnover in the trade

WITH the purpose of bringing our plant as near to a state of perfection as could be hoped for, we installed the very latest equipment when it was built, only four years ago, but since that time other newer equipment has been added and every possible improvement has been utilized to make our product perfect and to reduce our costs.

Our ambition was to turn out vinegar in glass packages which would be equal, and possibly superior, to anything on the market. The biggest difficulty with commercial vinegar is the formation of "mother" in the vinegar, which, although in no way injurious, is certainly unsightly and undesirable from the commercial standpoint. When vinegar is cloudy and full of "mother" in glass packages it will not move off the retailer's shelf with anywhere near the rapidity of vinegar which is brilliant, clear and possesses a desirable color, proper flavor, and aroma.

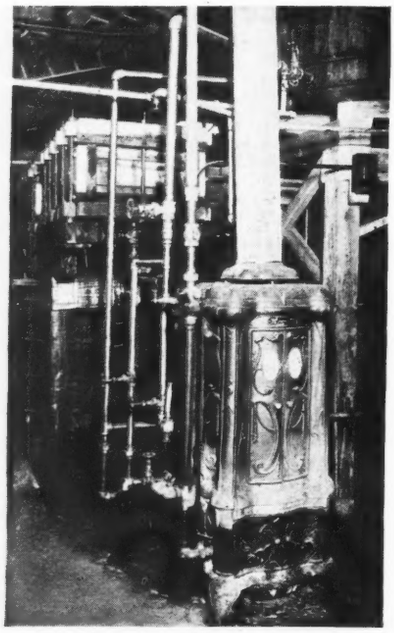


Fig. 1—Gas-fired instantaneous water heater converted into a vinegar pasteurizer. In the flues a series of small coils heats the water for the bottle washer. Note that all pipe lines are connected for washing out with fresh water.

To meet these qualifications we recently installed a gas-fired pasteurizer, additional filters and clarifiers, replacing a coal-fired boiler and a steam-heated pasteurizer. The new pasteurizer, which is easily recognized as a Humphrey instantaneous water heater, presented several obstacles to be overcome before its use in this service could be said to be a success.

Much experimentation was necessary to determine the proper temperature to attain so that proper pasteurization took place regardless of whether the flow of vinegar was slow or fast, for this would vary with the size of the containers being filled. Also the problem of corrosion of the copper tubes in the heater had to be considered. We eliminated this trouble by connecting all our pasteurizer pipes with the fresh-water system so that by means of a suitable arrangement of valves the vinegar lines can all be flushed out with water at the close of the day's work.

If cold bottles are filled with hot vinegar there is bound to be considerable breakage. In the past we have known it to be as high as 4 per cent when the glassware had not been properly annealed. Accordingly we installed a bottle washer and used warm water to wash and warm the bottles gradually. The water is heated in a coil in the flue of the pasteurizer and conserves heat that otherwise would be wasted. This heat economizer is merely two copper coils from a domestic tank water heater brazed together. It is located in the flue just above the heater.

In operation, the vinegar is pumped through the pasteurizer, then through the filters and to the filling machine. As soon as the vinegar begins to flow, the gas-fired heater automatically lights, and brings the temperature up to 155 to 160 deg. F. While the vinegar is flowing through the filters, the waste heat in the flue is heating the water with which to wash the bottles, and, of course, they are heated by this operation. The initial cost of the modernized system of pasteurization and its slightly greater cost of operation is more than justified by the superior quality of vinegar now bottled, which is finding the consumer acceptance that we desired.

Fig. 2—From the pasteurizer the hot vinegar passes through the filters seen at head level on the right. From the filters it goes directly to the fillers. Two men operate the plant.

Men, Jobs and Companies

INDUSTRY

American Can Co. won a legal victory recently when the U. S. District Court in Baltimore, Md., dismissed the complaint of A. W. Feeser, Inc., which charged the can company with fraudulent representation in making contracts with its customers. This case was one of 20 instigated against the company by a group of lawyers upon substantially the same allegation.

Ballard & Ballard Co. Oven Ready biscuit patents were the basis of a suit filed by Sterling Willoughby, Bowling Green, Ky., against L. B. Willoughby, his brother and former bakery partner. Sterling charges that his brother, the inventor of Oven Ready biscuits, is financially indebted to him, since he helped finance the perfection and marketing of the patents.

Booth Fisheries Co. has developed a freezing system of a new type that will freeze approximately 1,000 lb. of fish in 45 minutes and which can be used for other perishable foods. With the new method, foodstuffs are placed in Monel metal trays which travel along a monorail in an insulated chamber and pass through brine sprays. W. J. Hindron, chief engineer, is the inventor.

Montezuma Frozen Foods Co., Montezuma, Ga., successor to Tom Huston Frozen Foods, Inc., will start operations this month with a modernized plant. The products to be frozen include shrimp, peas, chicken, peaches, berries and certain vegetables for the wholesale trade only. W. R. Tucker, formerly with Tom Huston Frozen Foods, is president and W. P. Montgomery, formerly in the ice industry, is in charge of production. Dr. M. G. Weber will be the technologist.

National Confectioners' Association, Chicago, Ill., is holding sectional meetings in the principal cities as part of a program to expand its activities and increase its effectiveness in the confectionery industry.

National Biscuit Co. and Iten Biscuit Co., one of the largest baking concerns in the Central West, have merged, and Otto H. Barmettler, president of Iten, has been elected vice-president of National Biscuit with headquarters at Omaha, Neb. Iten products will be made and distributed by National Biscuit under its name and trademark.

New Amsterdam Brewing Co. has completed plans for a $2,500,000 brewery in New York, N. Y. Modern in every way, the brewery will have an initial capacity of 250,000 bbl. annually. It is reported that the company plans a similar plant in Buffalo, N. Y., as soon as the New York plant is completed, which will be next summer.

Pagoda Products, Inc., has been formed, for the industrial production of chow mein, by Fred S. Silverman, former sales manager with Chin & Lee Co., Inc., New York, N. Y. The first plant recently began operations in Long Island City, N. Y., and plants throughout the country are the ultimate aim of the management.

Piggly Wiggly Corp., Cincinnati, Ohio, asks damages in excess of $1,135,000 from the National Tea Co., Chicago, Ill., two subsidiary companies, and George Rasmussen, president of the companies, for alleged breach of contract, infringement of patents and the destruction of business good will. The suit was recently filed in the U. S. District Court at Chicago.

Western Malt Flour Milling Co., Bonner Springs, Kan., began manufacturing malted wheat flour and malted barley flour in a remodeled mill early in September. The wheat flour is supplied to mills manufacturing diastase-controlled flours. The barley flour is made for sale direct to bakers. The plant has a daily capacity of 250 bbl. or more.

PERSONNEL

D. Wellington Dietrich was recently made president of Freihofer Baking Co., Philadelphia, Pa., succeeding the late William Freihofer. Mr. Dietrich was treasurer of the company for a number of years.

Edgar B. Hutchins, Fond du Lac, Wis., nationally known candy manufacturer and formerly executive head of the Bonita Co.,

is now president and general manager of Diversey Corp., Chicago, Ill., manufacturer of chemical products. In his new position Mr. Hutchins is back in the chemical industry, which he served until 1909, when he entered the candy business. Mr. Hutchins was president of National Confectioners' Association in 1930-31 and served the organization in various capacities for about 20 years.

Allen O. McGinnis, who has been connected with General Foods Corp., or its subsidiary, Inglehart Bros., Inc., since 1924, has been appointed assistant to James F. Brownlee, vice-president of General Foods in charge of sales and president of General Foods Sales Co., Inc.

George K. Morrow and his brother, Fred, have resigned as chairman of the board of directors and president, respectively, of Ward Baking Corp. The Ward corporation had come under control of the Morrow interests only recently.

Gardner Poole, of Birdseye Packing Co., Inc., Boston, Mass., represented the U. S. Government at the Sixth International Congress of Refrigeration at Buenos Aires, making the trip at the request of President Hoover. He is expected to return Oct. 3.

Frank E. Sullivan, formerly president of J. D. & A. B. Spreckels Investment Co., controller of Western Sugar Refinery and Spreckels Sugar Co., has severed connections with these concerns to become president and general manager of California and Hawaiian Sugar Refining Co., Ltd. He succeeds A. M. Depeiu.

Frank R. Wilcox, marketing specialist of the University of California, has been made manager of United Prune Growers of California, the state's first all-industry agricultural organization. Mr. Wilcox served as manager of National Pecan Marketing Association for two years.

DEATHS

Timothy Driscoll, 100-year-old veteran of the meat packing industry, who was distinguished as one of the first men employed in the packing house of Philip D. Armour, founder of Armour & Co., died recently. Driscoll entered the industry in 1870 as a hog butcher for Plankinton & Armour, Milwaukee, Wis. Two years later he went with the newly established firm of Armour & Co., Chicago, where he served in various capacities for 20 years

John A. Hanna, for 25 years secretary and manager of exhibits for Canning Machinery & Supplies Association, died of heart disease Sept. 7. He was 76 years old. Mr. Hanna resigned as secretary of the association in 1930 on account of ill health and acted as manager of exhibits during the following year. Since then he had been assistant manager of exhibits, acting in an advisory capacity.

Sydney H. Kent, vice-president of Henry Maillard, Inc., candy manufacturer, died recently after a brief illness. Mr. Kent was born in England 53 years ago.

Frank O. Schujahn, president and treasurer of Winnebago Cheese Co., Fond du Lac, Wis., died Sept. 7 of heart disease. He was 60 years old. Mr. Schujahn served as treasurer of National Cheese Institute and was well known in the industry.

Moritz Thomsen, 83, managing director of Centennial Flouring Mills Co., Seattle, Wash., died Aug. 29. Mr. Thomsen was born in Schleswig-Holstein, and began his career in the food industries in the Chicago stockyards. Later he was a farmer, a farm implement manufacturer and then a miller.

Fred W. Ward, Pacific Northwestern manager for Peerless Yeast Co., died recently in Portland, Ore. He was 49. Mr. Ward entered the food industry with Royal Baking Co., later was connected with Flouring Mills Co., and then rejoined Royal Baking Co., where he was vice-president and superintendent until 1928.

THIS MONTH—

OCTOBER

2-7—American Bakers' Association Hotel Sherman, Chicago, Ill.

3-7—Twenty-first Annual Safety Congress and Exposition, Wardman Park and Shoreham hotels, Washington, D. C.

4-6—National Cooperative Milk Producers' Federation, Hotel St. Francis, San Francisco, Calif.

17-19—International Association of Milk Dealers, Statler Hotel, Detroit, Mich.

17-22—Dairy Industries Exposition; Dairy and Ice Cream Machinery and Supplies Association, Convention Hall, Detroit, Mich.

20-22—International Association of Ice Cream Manufacturers, Book-Cadillac Hotel, Detroit, Mich.

24-26—Mayonnaise Manufacturers' Association, Kenmore Hotel, Boston, Mass.

24-27—American Public Health Association, Hotel Willard, Washington D. C.

Hors d' Oeuvres

AT LAST they've found something radio waves can be used for besides advertising. And it's nothing less practical than cooking food. Westinghouse engineers have demonstrated that a frankfurter can be cooked in a field of radio beams.

•

DISTILLERIES may soon be producing Old Crow rubber tires. That is, if they take a tip from the Russians, who have converted vodka into synthetic rubber. There are so many interesting things that can be done with alcohol!

•

THIS ERA may some day be known as the age of drinks—no, not drunks—first it's tomato juice, then cranberry juice and pineapple juice. Now they're introducing carrot juice and cider that is brilliantly clear. Modern people can drink a toast to health in a literal sense.

•

CAN YOU imagine a stranger combination than a Japanese sailor and a Holstein cow? Neither could Japanese sailors, but a crew of them had to master the art of milking when their boat carried 45 bovines from San Francisco to Japan recently.

•

OH, YES, we forgot one new drink. A vitaminized chocolate-flavored drink made from the North Carolina soybean is being marketed by Harshaw Chemical Co., Cleveland. It is appropriately called Vi-Zoy.

•

PAPER-WRAPPED milk has been introduced into another town—Toledo. Sanitary Pure Milk Co. was incorporated there Sept. 21 to bottle milk in the "cast-away" paper containers.

•

BAKERS have a lot of crust these days. At least one in Kansas City has, for he developed a loaf of bread composed of eight small loaves, 1¼ in. thick, that give two heels each when cut. Yes, they named the new bread "Heelz."

What Food Men Are D

Sugar Trial Ends—Nut Tolerances Redu
Farmers Still Active—Poo Prun
Organize—Vitamin A—Pr

ALL MARATHON records for legal merry-go-rounds were shattered Sept. 23, when the Sugar Institute trial was clocked as the longest ever held in federal courts. Except for a two-month adjournment when the defense counsel became ill, and other shorter adjournments, the trial has been going continuously since Feb. 9. During that time, 10,550 pages of typed testimony has been taken, besides about 5,000 documentary exhibits, and more than 80 witnesses have been heard. The cost of this tournament, in which the government attempted to prove the institute guilty of violating the anti-trust laws through price regulation activities, is estimated at more than $1,000,000, all but about $50,000 of which falls upon the defense.

The trial closed with the testimony of Thomas S. Adams, professor of political economy at Yale, who declared he saw nothing indicative of restraint of free competition in the institute's activities. The government will file a brief Nov. 4, and the defense three weeks after that.

NUT importers and shippers made a valiant but unsuccessful effort to prevent tightening of restrictions on edible nuts. The Department of Agriculture has decided that nuts coming within jurisdiction of the Federal Food and Drugs Act have improved in quality and that conditions warrant a reduction in tolerances. Furthermore, conditional entry of shipments will be discontinued unless it can be proved that the nuts are damaged in transit, a leniency that will cease after Sept. 1, 1934.

The new tolerances, in percentages of deteriorated or unsound nuts, are 5 per cent for all shelled nuts and for unshelled almonds, 15 per cent for green chestnuts (marrons), and 10 per cent for other unshelled nuts. These rulings become effective Sept. 1, 1933.

WITH COFFEE stocks in this country depleted to less than 500,000 bags and with the Sao Paulo rebellion promising to continue for some time, the coffee industry finds itself in an uncomfortable position. To alleviate the situation, an effort is being made to drive a bargain for advance release of coffee stocks acquired by the Grain Stabilization Corp. in the coffee-wheat deal with Brazil. The stabilization corporation offered the Brazilian Coffee Council $1 a sack for advanced release, but $3 was demanded.

A significant step was taken in the domestic coffee industry Sept. 12, when the Associated Coffee Industries of America was organized at a Denver convention. Planned as the trade association of the entire industry, the organization, among other things, will act to increase the nation's per capita consumption of coffee, which has remained at 10 or 12 lb. a year for the last third of a century.

STRIKING farmers around Sioux City relaxed their vigilance at the first of September only to start picketing the roads a few days later. Since then the movement has spread, and the Farmers' National Holiday Association is optimistic over its influence. The biggest following seems to be among milk producers, since New York, Atlanta and Indianapolis are all threatened with milk strikes. In Wayne and Ontario counties, N. Y., cabbage growers have embarrassed sauerkraut manufacturers by deciding to hold their produce for $4 a ton, the present price being only half that.

HAWAIIAN pineapple growers are out to stabilize their hard-hit trade. In what is considered one of the major developments of the industry, the seven major packers have formed a non-profit cooperative marketing organization known as the Pineapple Producers' Cooperative Association, Ltd. The signatories to the agreement control the world production of pineapples. They are Hawaiian Pineapple Co., Libby, McNeill & Libby, California Packing Corp., Haiku Pineapple Co., Baldwin Packers, Kauai Pineapple Co., and Hawaiian Canneries. This year's pack of pineapples is expected to be about 5,000,000 cases, compared to 12,900,000 in 1931. Hereafter, the association will fix the total pack, based on expected sale and carryover.

CALIFORNIA'S $150,000,000 prune industry, after two extensions of the sign-up deadline, successfully completed its pool Sept. 3 with 160,023 tons of prunes on the books, a bare margin of 23 tons. The result of the campaign, according to Hugh S. Hersman, chairman, is expected to be an immediate increase in the price of prunes. The organization is known as United Prune Growers of California.

VITAMIN A is being produced commercially in concentrated form by S. M. A. Corp., Cleveland, which announces that the vitamin is available

Doing and Saying

Reduced—Coffee Stocks Scarce—
Prunes—Pineapple Packers
—Produce Statistics

at a reasonable price. It is offered in three forms, as crystalline carotene sealed in vacuum to prevent oxidization, as a solution of carotene in bland oil for therapeutic purposes, and as a combination of carotene and cod liver oil. Either form is to be used under medical supervision.

Carotene occurs in nature with xanthophyll and chlorophyll in alfalfa, spinach, leaf lettuce and similar plants, and it is believed to be the principal pigment in such plants as squash, pumpkin, carrots and sweet potatoes. The usual laboratory methods of preparation involve extraction of carotene with a fat solvent such as chloroform or petroleum ether and evaporation of the solution to the point of carotene crystallization. Thoroughout the process, it is necessary to work in the presence of non-oxidizing atmospheres, since the minute concentration makes it imperative to check losses in manufacture.

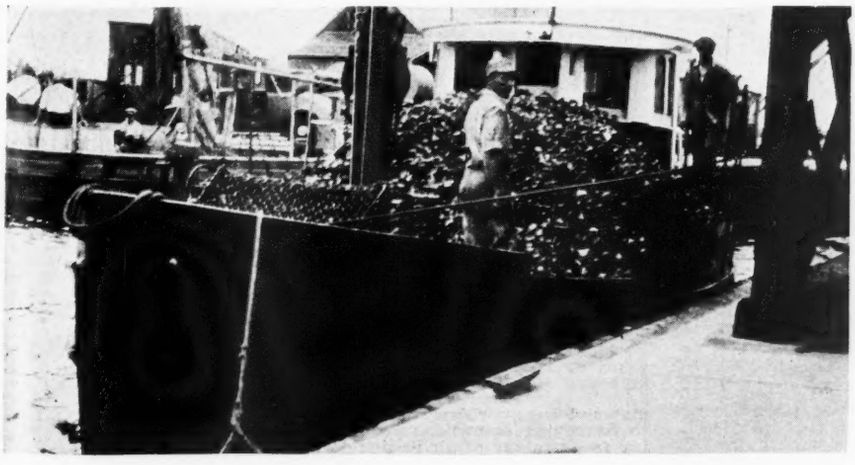
FEDERALLY inspected slaughter during the first seven months of this year was about 5 per cent smaller than in the corresponding period last year, the Bureau of Agricultural Economics reports. It also points out that cattle slaughter has been decreasing each year since 1926. However, the number of cattle has increased for about five years, principally in breeding stock, and a material increase in the output of beef is indicated during the next few years.

Total landings of fish at Boston and Gloucester, Mass., and Portland, Me., for the first seven months of this year were 144,026,233 lb., compared to 162,251,660 lb. a year ago. Little change is expected in the Alaska salmon pack, the season's pack being placed at over 5,000,000 cases, about the five-year average. Besides the catch, the escapement to the spawning grounds is said to be large enough to insure a heavy run again in 1937.

SOME CROPS developed toward greater yields in recent weeks, while others were adversely affected. Combined production of durum and other spring wheat was placed at only 272,750,000 bu. as of Sept. 1, a decrease of 8,149,000 bu. from the Aug. 1 figure. Most of this decline is in durum wheat. Corn and oats, on the other hand, improved about 1 and 2 per cent, respectively, but rice prospects are 6.1 per cent less than Aug. 1, being forecast at 37,711,000 bu.

Unofficial figures show a decrease of 16 per cent in the national cranberry crop compared to a year ago, the estimated production being 541,000 bbl. The tomato pack is faring better and government figures indicate a 26-per cent, or 254,400-ton, increase over the short 1931 pack of 981,500 tons. Unlike tomatoes, the pea pack, which is now completed, is 22 per cent below last year's pack, or 10,117,784 cases. Likewise, the 1932 sweet corn crop is one of the smallest in years, being, as of Aug. 1, 56 per cent of last year's and 44.8 per cent of the five-year average.

One of the first hauls of the oyster season. When this industry got under way in September, about 17,000 men were put to work. The government predicts an abundant supply of high-quality oysters this season and places the value of the catch at $12,000,000



—AND THE NEXT

NOVEMBER

31-2—National Fertilizer Association, Biltmore Hotel, Atlanta, Ga.

1-4—National Association of Practical Refrigerating Engineers, with exhibit, Hotel Sherman, Chicago, Ill.

2-3—National Creamery Buttermakers' Association, Mason City, Iowa.

10—National Malt Products Manufacturers' Association, quarterly meeting, Hotel Pennsylvania, New York, N. Y.

14-15—Institute of American Meat Packers, Drake Hotel, Chicago, Ill. Departmental meetings will be held Nov. 11-12.

14-18—American Bottlers of Carbonated Beverages, annual meeting and international exposition, Cleveland Public Auditorium, Cleveland, Ohio.

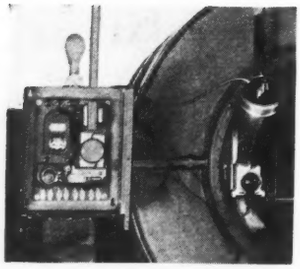
15-18—National Association of Ice Industries, with exhibition, William Penn Hotel, Pittsburgh, Pa.

29—American Association of Creamery Butter Manufacturers, Palmer House, Chicago, Ill.

Concentrates

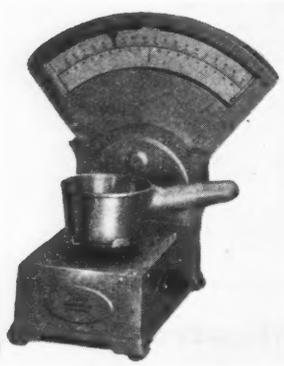
India cannot justifiably pledge herself to any program of trade and commerce that might ultimately interfere with the reciprocity of commerce that will eventually reward her direct relations with the United States, is the opinion of D. C. Ghose, secretary of India Tea Planters' Association . . . A prune with a small pit has been developed by O. H. Jacobsen, Silverton, Ore. . . . Potato chips may be kept in their original crisp condition for an indefinite time in a new colored cellulose bag developed by Dernell Potato Products Co. and du Pont Cellophane Co., it is reported . . . Better grade, color and flavor are characteristics of dehydrated apples produced by a new process perfected by T. S. Sims & Co., Ltd., St. John, New Brunswick . . . Before long, a wide variety of fruits will be frozen and marketed by ice cream companies, A. E. Reynolds, California ice cream specialist, believes . . . Ice cream coatings in colors that correspond to the flavor of the product are a development of a New York chemist . . . Wheat from rusted plants has been found lower in protein and higher in starch than that from plants not infected . . . Storage at —40 deg. C. materially reduces activity of invertase in certain frozen fruits . . . Natural and sulphured grape juices corrode nickel more than Monel metal except in the case of natural white juice . . . Fresh apricots lose 30 to 50 per cent of vitamin C content during cooking, but sulphured fried apricots appear to lose none . . . Baldwin apples retain their original vitamin C content when stored for four months but lose much of it in nine months. (Note—The foregoing five items are from papers presented before American Chemical Society) . . . A mysterious wheat disease which completely destroys the grain it attacks has been discovered near Salina, Kan. . . . A bill has been introduced in the Alabama Senate to prohibit the use of motor trucks on the highways of the state on Sunday, except for interstate commerce and hauling perishable farm products.

NEW EQUIPMENT FOR



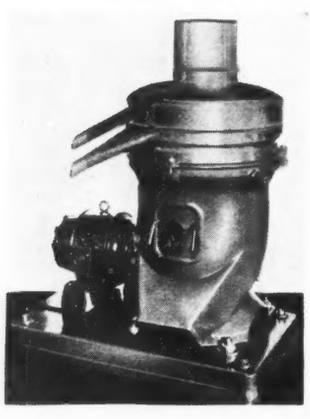
Coffee Roaster With Electric Eye

"Electric-eye" control is afforded by the Talbutt Electric Coffee Roaster of McCormick Electric Roaster Sales Corp., Baltimore, Md. A photo-electric cell is attached to the front of the roaster over an opening before which the coffee passes during the roasting process. As soon as the coffee attains the proper color, the cell operates visual or audio signals.



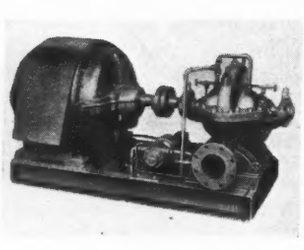
Automatic Overrun Scale

Ice cream manufacturers are assisted in drawing batches at correct overrun by an automatic scale developed by Triner Sales Co., 222 North Bank Drive, Chicago, Ill., according to the maker. In operation, net weight of mix is determined and a pointer on the scale set to the figure representing overrun desired, this being obtained from a table. Then batches are drawn when this figure is reached. The scale is of the double-pendulum type, having no springs. It is completely inclosed and has an electrical heater inside to drive out moisture.



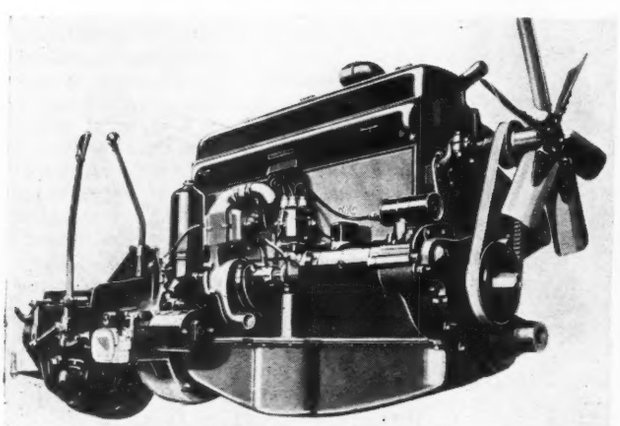
Self-Cleaning Centrifuge

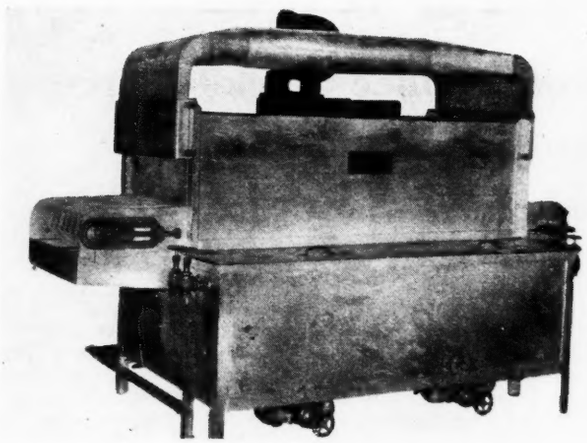
Application of high centrifugal force together with continuous handling of liquids containing a relatively high percentage of solid material is said to be obtained by the Rotojector Centrifugal developed by Sharples Specialty Co., 501 Fifth Ave., New York, N. Y. This machine is designed for separating and clarifying operations in which the large amount of bowl cleaning formerly involved obviated high centrifugal force. The rotojector has a bowl that slides in a casing to uncover an annular slot for discharging solids while the bowl is running at full speed.



Self-Priming Centrifugal Pump

Priming is automatic in a self-contained pumping unit announced by Worthington Pump & Machinery Corp., Worthington Ave. at Warren St., Harrison, N. J. This unit comprises a ball-bearing centrifugal pump mounted on a fabricated steel bedplate together with a motor and a priming unit of the wet vacuum type. The primer is controlled by an electric pressure switch. The advantage claimed for this pump is that it does not sacrifice efficiency for self-priming.





Two-Ply Corrosion-Resisting Steel

Two-ply steel comprising stainless steel on a carbon steel backing has been developed for commercial use by Ingersoll Steel & Disc Co., Chicago, Ill. The new metal, known as Ingoclad Stainless Steel, is said to have a perfect bond between the stainless and carbon steels. It may be deep drawn, stamped, welded, formed and polished. The metal will be used in corrosion-resisting equipment.

High-Power Truck Engine

More horsepower and higher torque per cubic inch displacement than are obtainable in any other truck engine are developed by a six-cylinder, Model 400 engine announced by General Motors Truck Co., Pontiac, Mich., the manufacturer says. It generates 296 ft.-lb. of torque between 800 and 1,600 r.p.m. and 112½ brake horsepower at 2,800 r.p.m. Its features include a special chrome-nickel cylinder head with dome-shaped combustion chambers, tulip exhaust valves with stellite faced seats, and a 144-lb. drop-forged, counterweighted crankshaft with harmonic balancer. Offered as standard equipment in company's 5- to 7½-ton trucks.

Stainless, Open-Mesh Conveyor Belting

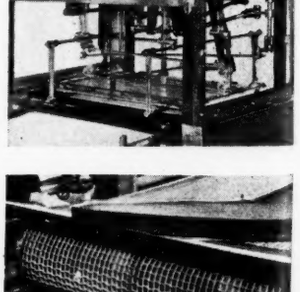
Open-mesh conveyor belting of stainless steel, the wearing surfaces of which will not rust and cause the cross-wires to be cut, is made by Acme Steel Co., 2840 Archer Ave., Chicago, Ill. The belting comprises continuous U-shaped strips held together by wires at 1-in. intervals. Openings are ⅛x1 1/16 in.; weight is 1.75 lb. per square foot. This material is particularly adapted to conveying operations requiring free passage of air or liquid.

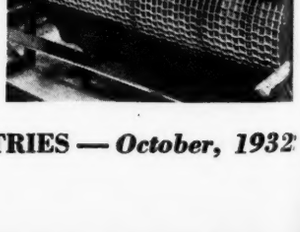
Automatic Washer

Metal food containers may be washed automatically in a machine built by New York Engineering Co., 75 West St., New York, N. Y. The Model 330-A Engel Industrial Washer made by this company comprises, essentially, a conveyor, sprays located above and below the conveyor, a centrifugal pump, a water tank and motors for driving the conveyor and pump. The unit is inclosed in a metal cabinet. Engel washers are built in combinations to include the following operations: washing, rinsing, blow-off, drying and slushing. Illustration shows one used in ice cream industry.

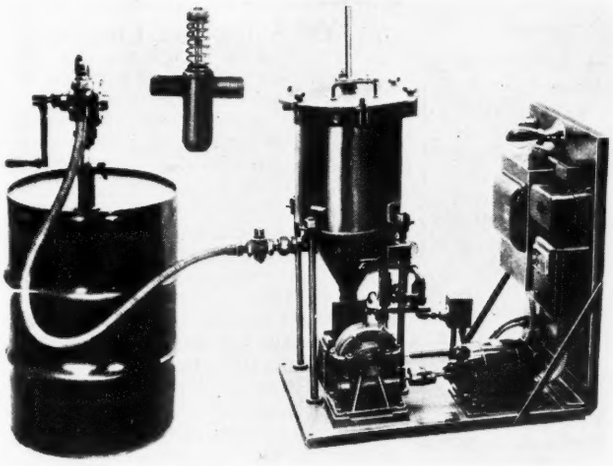
Chocolate Candy Decorator

Chocolate-coated candies are decorated in a manner said to be equal to that accomplished by hand-dipping by the Bausman Decorator No. 3, manufactured by National Equipment Co., Springfield, Mass., for attachment to its enrober. The decorations are formed by an endless oilcloth belt. This contacts the candy while moving forward in synchronization with it. Then it raises slightly without moving forward, bringing the chocolate picked up toward the rear of the pieces. Next, it travels through a predetermined path to form the desired decoration. Variation in design is obtained by changing two cams.





FOOD MANUFACTURERS



Multi-feed Grease And Oil System

Light greases and heavy oils may be applied to points requiring regular lubrication by a mechanical system developed by Hills-McCanna Co., 2349 Nelson St., Chicago, Ill. The lubricator is a single-feed system with branch lines to points requiring lubrication. An independent measuring unit is placed at each bearing. A positive pump forces the lubricant to the bearings and pressure is applied only when the points are being lubricated. Heating unit is supplied for winter.

Mechanical Car Icer

Refrigerated cars are easily iced by an elevating mechanism developed by Link-Belt Co., 910 South Michigan Ave., Chicago, Ill. The icer is built for attachment to truck bodies and also as a portable machine. In operation, a 150-lb. cake of ice is placed on the skip of the machine and a clutch pedal is depressed. Then the skip ascends, discharges and automatically descends. A safety device prevents the skip from falling until the ice has been discharged. When the icer is not in use, the upper half may be folded down.

THE MANUFACTURERS OFFER

Industrial Spray—In a 20-page, illustrated pocket-size booklet, the problem of killing flies, mosquitoes and other insects is discussed by Sinclair Refining Co., Inc., New York, N. Y. A chart is given that shows how much P. D. Industrial Spray is required to kill every flying insect in any given size room.

Pipe Savers—A folder leaflet by Sarco Co., Inc., 183 Madison Ave., New York, N. Y., describes, illustrates and discusses the advantages of the company's pipe savers. Prices are listed.

Material Handling — Lifting, pulling and hauling trucks, as well as conveyors, are illustrated and briefly described in a 48-page vest-pocket booklet by Clark Tructractor Co., Battle Creek, Mich.

Cooling Cabinets—The mechanical and structural features of electrical milk cooling cabinets made by Domestic Utilities, Garrison Blvd. and Western Maryland R.R., Baltimore, Md., are presented in an 8-page loose-leaf bulletin of the company. Dimensions, weights and required motor sizes are listed.

Variable-Speed Motors — Multi-speed squirrel-cage motors are the subject of a 6-page, well-illustrated, loose-leaf bulletin released by Wagner Electric Corp., 6459 Plymouth Ave., St. Louis, Mo. Different applications are described as to problems involved and type of motor required.

Dryers—A one-page leaflet by Buck Dryer Corp., Manchester, Conn., lists the products manufactured by the company, describes them briefly and illustrates some.

Photoelectric Relays—A 4-page leaflet by G-M Laboratories Inc., 1731 Belmont Ave., Chicago, Ill., is devoted to the illustration and description of the different elements of the company's photoelectric relays. Control applications are listed.

Vibrating Screen—Gifford-Wood Co., Hudson, N. Y., has released a 10-page booklet which illustrates and describes in detail the Mitchell electric vibrating screen. Uses, operating characteristics and pertinent incidental information are included.

Brewing Equipment—In a folder leaflet, the use of stainless steel in the brewing industry is described by Electro Metallurgical Co., 30 East 42d St., New York, N. Y.

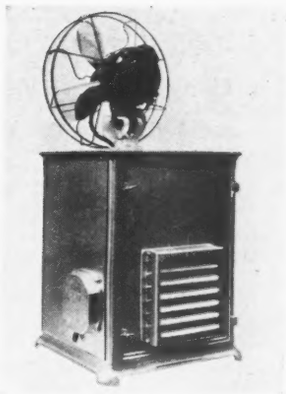
Ohio Market—The results of a study of distribution in the southwestern Ohio market are presented in a 20-page mimeographed booklet prepared by Industrial Bureau of Springfield, 14 East Main St., Springfield, Ohio.

Water Softeners — The application of zeolite water softeners to the treatment of boiler feed water is the subject of a well-illustrated 36-page booklet by Permutit Co., 440 Fourth Ave., New York, N. Y. Much technical information, including a raw-water analysis table, pressure and head conversion factors, pipe friction and capacity tables, is included.

Timestarters — A leaflet by Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., describes and gives applications for the company's heavy-duty timestarters for constant-speed d.c. motors.

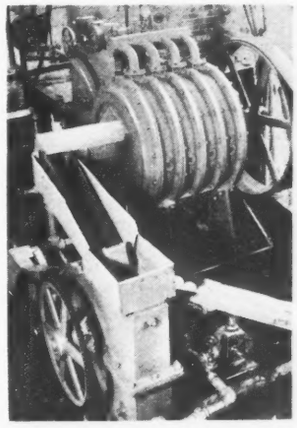
Portable Ozone Generators

Destruction of foreign particles in air to eliminate contaminating odors and prevent must and mold in confined spaces, as freezers and coolers, is said to be accomplished with an ozone generator manufactured by William L. Lohman, Inc., 92 Warren St., New York, N. Y. This machine is made in various sizes, but all are portable. The unit produces ozone by a brush discharge from cylindrical glass condensers. The small size generates 1/12 gram of ozone per hour and consumes 40 watts. It will serve a room 30x60 ft. A circulating fan is optional.



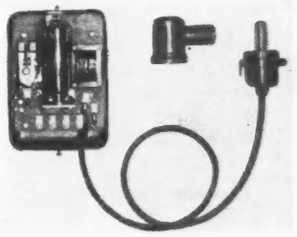
Rotary Ice Machine

Ice in flaky form is produced by a PackIce machine made by Vilter Manufacturing Co., Milwaukee, Wis. This machine has an outer casing fitted with a corrugated liner, liquid ammonia being circulated through the space between. Water pumped through the space inside the liner freezes on the liner surface. The ice film thus formed is removed continuously by tool-steel scrapers attached to a rotor. Ice leaves the machine as small flakes suspended in water. It is deposited in a storage bin, and the water drains off, to be recirculated through the freezer. Briquets may be obtained by passing the ice through a compressing machine.



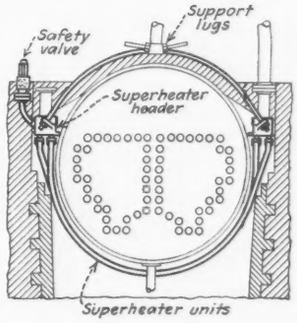
General-Purpose Photo-electric Relay

Several new features are said to be included in a new general-purpose photo-electric relay developed by General Electric Co., Schenectady, N. Y. More sensitive control, a wide range of applications and operation at a minimum light intensity of 3 foot-candles, compared to 10 foot-candles for the old model, are afforded by the instrument.



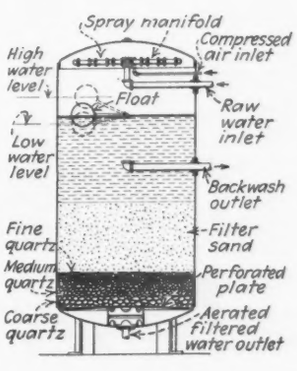
Simple Superheater For HRT Boiler

Horizontal-return tubular boilers may easily be equipped to superheat steam with a unit designed by Superheater Co., 60 East 42d St., New York, N. Y. This superheater comprises two cast-steel headers, suspended one on each side of the boiler shell and connected by detachable tubular elements extending around the underside of the boiler. By raising or lowering the headers, which changes the position of the tubes in the combustion chamber, the superheat temperature may be regulated.



Filter for Removing Iron From Water

Iron and odors are removed from water by pressure aeration and filtering with a unit built by Elgin Softener Corp., Elgin, Ill. The water is sprayed into a pressure filter tank, the top portion of which is filled with compressed air that supplies oxygen to oxidize the ferrous iron to ferric iron which is removed by a sand filter. Water filtered at the rate of 3 gal. per minute per square foot of sand area rarely contains more than 0.1 part per million of iron.



BUSINESS TRENDS

Cereals, Nuts, Macaroni Decline in Value

Declines of 18, 29.6 and 23.4 per cent, respectively, are shown in the value of cereal preparations, processed nuts and alimentary pastes made in the United States, by a comparison of the Census of Manufacturers for 1931 and 1929. The value of cereal preparations, including breakfast foods, prepared flour, coffee substitutes and others, amounted to $138,719,000 last year, as against $168,708,257 for 1929. There were 106 establishments in this industry in 1931, a decrease of 12.4 per cent. However, there were 7 per cent more wage earners and an increase of 3 per cent in wages. The value added to cereal products by manufacture amounted to $70,664,216 last year, as against $73,751,606 two years previous.

The value of nuts processed or shelled in 1931, including peanuts, English walnuts, pecans and almonds, was $36,423,121, compared to $51,739,740 in 1929. There were 151 establishments, or 10.7 per cent less than in 1929. Wage earners were 6.8 per cent fewer and wages were down 7.5 per cent. In spite of these declines, the value added by manufacture was 3.8 per cent greater, being $10,467,381.

The value of macaroni, spaghetti, vermicelli, noodles and ravioli produced last year amounted to $35,442,187, as against $46,243,164 in 1929. There were 306 establishments, or 13.3 per cent less. The number of wage earners had dropped 6.1 per cent and wages declined 16.9 per cent. The value added by manufacture was 19.3 per cent less, being $15,921,751.

Business Advances

Business conditions continue to show modest improvement. The bullish stock market, so prominent last month, has receded to levels more justifiable. Greater attention is given to factors which have a more basic influence upon business betterment. Committees recently appointed by President Hoover to add impetus to the upturn of business are beginning to function.

The Business Week index of general business activity for the week ending Sept. 17 indicates 55.0 per cent of normal, as compared with 53.3 per cent for week ending Aug. 20. Wholesale prices of all commodities, reported by the U. S. Department of Labor, show no change for the 4-week period ending Sept. 17. Food prices advanced 0.485 per cent. A weighted index shows price increases of 2.05 per cent for all commodities and 0.73 per cent for food for the week ending Sept. 24, as compared with that of Aug. 20.

A. & P. tonnage sales for August were 3.40 per cent below those for August, 1931, an improvement of 23.43 per cent over July, 1932.

BASIS FOR THE CURVES

Retail food prices, factory employment, factory payrolls and wholesale prices are based on indexes of the Department of Labor. Cost-of-living index is that of the National Industrial Conference Board. Electrical power consumption figures are furnished by *Electrical World*.

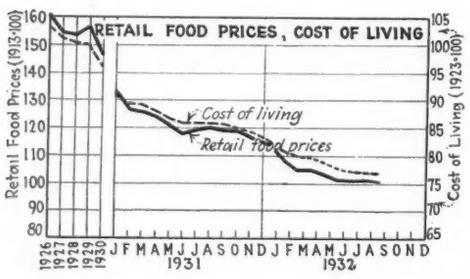
Government Defines Scope Of Sales Tax Clauses

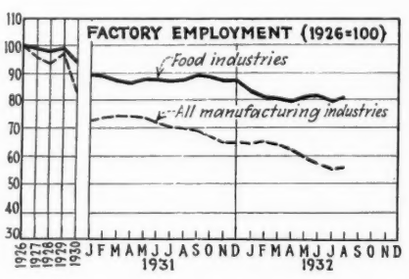
Retailers become manufacturers when they produce a syrup by using a concentrate or essence or by diluting a concentrated syrup with a simple syrup, and they must pay the tax of 6c. a gallon on sales of such syrup, the Bureau of Internal Revenue has decided. Other tax rulings stipulate that consolidated returns of corporations and subsidiaries in connection with payment of the manufacturers' taxes are not authorized; and that solid CO_2 will not be taxed under the Revenue Act of 1932.

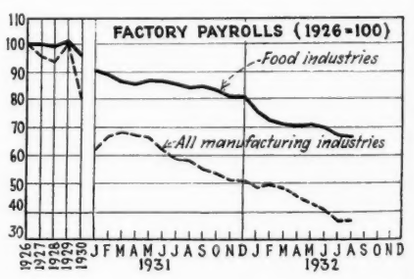
It is also held that candy manufacturers who sell only to jobbers and chain stores are subject to the tax, the basis for taxation being the actual sale price of each article.

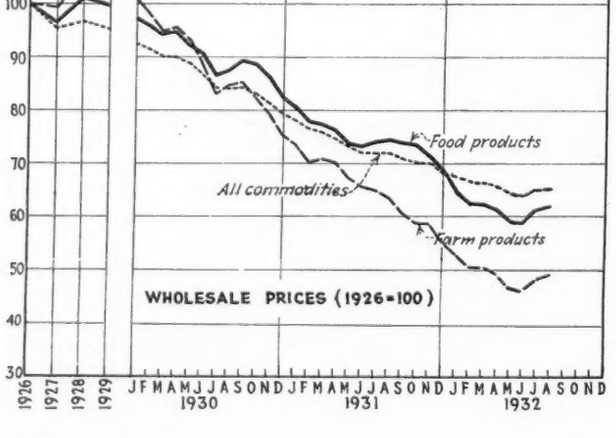
Less Food on Hand, Report Shows

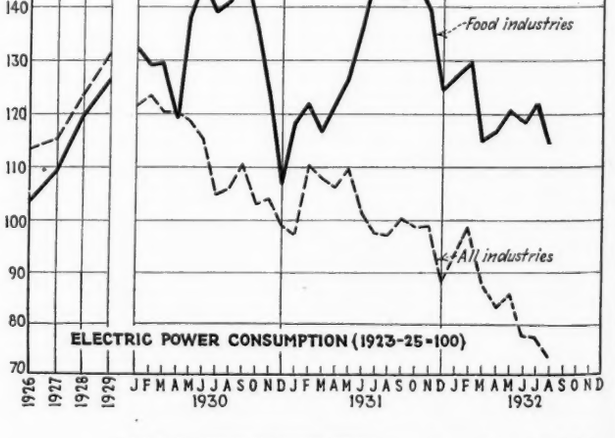
Cold storage holdings, as reported by the Bureau of Agricultural Economics for Sept. 1, are lower for most products. There was a decrease, as compared to holdings a year ago and to the five-year average for holdings as of Sept. 12, in frozen and preserved fruits, eggs in the shell and frozen poultry and meats. Holdings of cream were up, as against a year ago, and those of lard were higher than last year but lower than the five-year average for Sept. 1. Frozen fish stocks as of Aug. 15 totaled only 51,091,903 lb., compared to 57,517,535 lb. in 1931 and a five-year average of 61,618,000 lb.


RETAIL FOOD PRICES, COST OF LIVING
Retail Food Prices (1913=100)
Cost of Living (1923=100)
Cost of living
Retail food prices
1926 1927 1928 1929 1930 1931 1932









CONSTRUCTION NEWS

	Proposed Construction Pending	Contracts Awarded — Awarded September	Cumulative 1932 — No. Awards	Cumulative 1932 — Total
Bakery Products	$510,000	$232,000	24	$2,880,000
Beverage	2,630,000	.....	7	422,000
Canning and Preserving	605,000	30,000	15	680,000
Confectionery	65,000	.....	1	30,000
Grain Mill Products	324,000	70,000	21	4,885,000
Ice, Manufactured	80,000	.....	37	1,751,000
Meats and Meat Products	135,000	36,000	28	1,984,000
Milk Products	350,000	30,000	38	3,446,000
Sugar	.....	.....	1	40,000
Miscellaneous	255,000	98,000	25	2,471,000
Total	$4,954,000	$496,000	197	$18,589,000

PROPOSED WORK BIDS ASKED

Bakery—Joseph Bellono, Archt., 6 Park Ave., Paterson, N. J., is receiving bids for a 2 story bakery, including stores and apartments, at Mill and Grand Sts., Paterson, for R. Cannizzaro & A. Feranciclo, 75 Cross St., Paterson. Estimated cost $35,000.

Bakery—Berdean Holding Corp., 821 Bergen St., Brooklyn, N. Y., plans to alter 2 and 4 story bakery at Bergen St. and Grand Ave. Nathan Rotholz, 155 East 42nd St., New York, N. Y., is architect.

Bakery and Confectionery Plant — John Di Giacoma, Union Pier, Mich., plans the construction of a bakery and confectionery plant. Estimated cost $35,000.

Bakery—Sarah Freedman, 2nd and Keap Sts., Brooklyn, N. Y., plans to construct a 2 story addition to bakery. Estimated cost $40,000. Morris Whinston, 570 7th Ave., New York, N. Y., is architect.

Bakery — Walter Freund Bread Co., 4479 Chouteau Ave., St. Louis, Mo., plans to build a 2 story, 40 x 200 ft. addition to its bakery on Chouteau Ave. Will probably take bids in December. William A. Lucas, 3411 Halliday Ave., St. Louis, is architect.

Baking Compound Factory — Lookout Oil & Refining Co. (subsidiary of Armour & Co.), Kirkland Ave., Chattanooga, Tenn., plans the construction of a factory for the manufacture of "Cre-mit," a baking compound. Estimated cost $250,000. R. E. Biggers is general manager.

Bakery — E. Mannetta, 1390 Herkimer St., Brooklyn, N. Y., is having plans prepared for altering and installing new equipment in bakery at Eastern Parkway and Herkimer St. Estimated cost $40,000. C. P. Cannella, 1163 Herkimer St., is architect.

Bakery—Richardson Baking Co., Gloucester, Ohio, plans to build a 1 story addition to its bakery.

Brewery — Anna Kalb, 146-152 West 29th St., New York, N. Y., is having plans prepared by P. Schreinir, Archt., 12-09 116th St., College Point, N. Y., for altering and rebuilding 1 and 2 story, 100 x 100 ft. brewery and storage building at College Point.

Brewery—Lackman Brewing Co., H. A. Lackman in charge, 4365 Carnation Pl., Cincinnati, O., plans the construction of a brewery. Estimated cost to exceed $40,000.

Brewery — New Amsterdam Brewing Co., Herbert L. Noll, Pres., 10 East 40th St., New York, N. Y., plans to construct a brewery, to include brew and stock houses, bottling plant, power house, offices and garage. Estimated cost $2,500,000.

Flavoring Extracts Plant—Wyss Manufacturing Co., 3640 20th St., San Francisco, Calif., plans to rebuild part of its plant recently damaged by fire. Estimated cost to exceed $50,000.

Confectionery Plant—Southern Premium Co., East Dallas, Tex., plans to repair its plant recently damaged by fire. Estimated cost $65,000.

Cheese Factory — J. R. Olmstead, North Gower, Ont., plans to construct a cheese factory here. Estimated cost including equipment $25,000.

Creamery—J. R. Garrison and A. Haverstock, Uvalde, Tex., recently purchased Thompson's Creamery and plan to install new machinery and equipment.

Bottling Plant — Dairymen's League Cooperative Association, 11 West 42nd St., New York, N. Y., plans altering and constructing 84 x 120 ft. addition to bottling plant and milk distribution station at 546 East 19th St. Estimatad cost $100,000.

Dairy—DeForest Dairy Co., De Forest, Wis., plans to construct a dairy. Estimated cost $40,000.

Dairy — James Mills, 239 Donaldson Ave., Rutherford, N. J., plans to rebuild dairy at Bartley, N. J., recently destroyed by fire. Estimated cost $40,000.

Dairy—State of California, G. B. McDougall, State Archt., Sacramento, plans to build dairy unit at State Hospital at Talmage, Calif. Estimated cost $40,000.

Warehouse—Conestoga Cream & Cheese Mfg. Co., 593 South 21st St., Irvington, N. J., plans to rebuild warehouse and office recently destroyed by fire. Estimated cost $40,000.

Ice Cream Plant—Edward Minecheske, Tigerton, Wis., taking bids for 2 story, 82 x 98 ft. dairy and ice cream plant. Oppenhamer & Obel, Wausau, Wis., are architects.

Feed Mill—Osen Milling Co., C. Scott, mgr., DePere, Wis., taking bids for 1 story, 40 x 120 ft. feed mill. Foeller & Scholber, 310 Pine St., Green Bay, Wis., are architects.

Grist Mill—Crawford Bros., Walton, N. Y., having preliminary plans prepared for the construction of a grist mill. Estimated cost will exceed $45,000.

Feed and Grist Mill—L. W. Shawfer, Buffalo Center, Iowa, plans to build feed and grist mill. Estimated cost $25,000.

Flour Mill — Acme-Evans Co., 852 West Washington St., Indianapolis, Ind., is having plans prepared by Bacon & Tislow, Archts., 1015 Architects Bldg., Indianapolis, for 3 story flour mill. Estimated cost $29,000.

Flour Mill—P. W. Goetitz, Grassrange, Mont., plans to construct a flour mill and storage building. Estimated cost $40,00.

Flour Mill—Roedersville Flour Mills, Pottsville, Pa., plans to alter and repair flour mill recently damaged by fire.

Grain Elevator—Farmers Co-Operative Elevator, Greenfield, Iowa, plans to rebuild elevator destroyed by fire. Estimated cost $40,000.

Grain Elevator—H. T. Ingalls & Son, Cairo, Neb., plans the construction of a grain elevator. Estimated cost $40,000.

Grain Elevator—United Grain Growers Ltd., Bank of Hamilton Bldg., Winnipeg, Man., plans to construct a grain elevator at Dominion City, Man.

Distribution Plant—National Ice & Fuel Co., 39 Morris St., Jersey City, N. J., plans the construction of a 125 x 200 ft. distribution plant at 29th St. near Bergen Turnpike, North Bergen. Estimated cost exceed $40,000.

Ice Plant — Fresno-Madera Ice Co., Blackstone Ave., Fresno, Calif., plans to construct a 1 story, 40 x 100 ft. ice manufacturing plant. C. E. Butner, Cory Bldg., Fresno, is architect.

Meat Packing Plant — Providence Dressed Beef Co., 45 Concord St., Pawtucket, R. I., plans to construct a 1 story, 100 x 120 ft. meat packing plant and slaughter house on Concord St. Estimated cost to exceed $40,000.

Packing Plant—Young Provision Co., Wooster, Ohio, plans to build a packing plant. Estimated csot $55,000.

Slaughter House—Colfax Packing Co., c/o A. Worcester, Hotel Biltmore, Providence, R. I., is having plans prepared for a 1 story, 50 x 75 ft. slaughter house on Colfax St., Pawtucket, R. I. Estimated cost $40,000.

Packing Plant—Ventura Citrus Association, Ventura, Calif., is receiving bids for a 1 story, 100 x 150 ft. addition to its packing plant. W. W. Ache, 1616 4th Ave., Los Angeles, is architect.

Packing Plant—Standard Brands, Inc., 595 Madison Ave., New York, N. Y., plans to build a packing plant on Jones Ave., Oakland, Calif. Estimated cost $500,000.

Fruit Packing Plant—Hewitt Canning Co., Ltd., Amherst, N. S., plans the construction of a vegetable and fruit packing plant.

Cannery—Eagle Valley Cannery, C. H. Brooks, in charge, Newbridge, Ore., having preliminary plans prepared for cannery. Estimated cost $35,000.

Fruit and Vegetable Cannery—Unon Socialist Soviet Republics c/o Amtorg Trading Co., 261 Fifth Ave., New York, plans the construction of a fruit and vegetable cannery in Sardar-Abad (Armenia) Soviet Russia. Estimated cost $5,000,000.

Fish Oil Plant—J. Howard Smith, Port Monmouth, N. J., plans to construct a fish oil manufacturing plant here. Estimated cost $150,000.

Market—H. & P Lengie, c/o S. Gardstein, Archt., 44 Court St., Brooklyn, N. Y., is having plans prepared for a market on Queens Blvd. and 56th Ave., Woodside, N. Y., to include refrigeration plant. Estimated cost $30,000.

Storage Building — National Grocers Co., Niagara Falls, N. Y., plans to construct a storage building. Estimated cost to exceed $75,000.

CONTRACTS AWARDED

Bakery — Abilene State Hospital, Abilene, Tex., awarded contract for 1 story, 35 x 40 ft. bakery to Jeter & Chambers, Abilene.

Bakery — Pauline Katz, Plainfield, N. J., awarded contract for 1 story bakery at 411 John St., Plainfield, to John Zmuda, Scotch Plains, N. J. Estimated cost $28,500.

Bakery — McDonald Baking Co., Inc., 81 Springdale Ave., Newark, N. J., awarded contract for 1 story addition to bakery to Louis D. Kilgus, 11 Coes Pl., Newark. Estimated cost $28,500.

Bakery — McDonald Baking Co., Inc., 81 Springdale Ave., Newark, N. J., awarded contract for 1 story bakery at Garwood, N. J., to Louis D. Kilgus, 11 Coes Pl., Newark. Estimated cost $28,500.

Bakery—National Biscuit Co., 449 West 14th St., New York, N. Y., awarded contract for altering 6 story plant to Aronberg-Fried Co. 527 5th Ave., New York, N. Y. Estimated cost $75,000.

Bakery—The Rose Co., c/o Garfield Baking Co., 152 Hope Ave., Passaic, N. J., awarded contract for 2 story, 65 x 100 ft. bakery, garage and apartment building at 181-83 Hope Ave., to Greenwald & Feber, 159 Autumn St., Passaic. Estimated cost $40,000.

Dairy—Titusville Dairy Products Co., South Washington St., Titusville, Pa., awarded contract for 2 story, 26 x 88 ft. dairy to Sherwood, Vontacky & Sherwood, 415 North Washington St., Titusville.

Grain Elevator—Orofino-Rochdale Co., Orofino, Idaho, awarded contract for grain elevator to Merrell & Hanson, Orofino. Estimated cost $20,000.

Grain Elevator — Whitewater Milling Co., Whitewater, Kan., awarded contract for grain elevator to have capacity of 30,000 bu., to McDowell Construction Co., Denver, Colo.

Lobster Plant — Consolidated Lobster Co., Inc., 924 Washington St., Gloucester, Mass., awarded contract for 2 story, 40 x 50 ft. lobster plant to Thibeau & Comeau, 4 Brattle St., Cambridge, Mass.

Packing Plant—Western Meat Co., South San Francisco, Calif., awarded contract for addition to packing plant to Monson Bros., 475 6th St., San Francisco. Estimated cost $35,650.

Produce Plant—Farmers Produce Co., Crawfordsville, Ind., awarded general contract for 1 story, 26 x 90 ft. plant on Washington St., to Al. Fishero, Crawfordsville. Estimated cost $29,300.

Produce Warehouse and Store—First National Stores, Inc., 5 Middlesex Ave., Somerville, Mass., awarded contract for 1 story, 60 x 112 ft. warehouse and store on Center St., Vineyard Haven, Mass., to Nathan Bernstein, 35 Almont St., Dorchester, Mass. Estimated cost will exceed $28,500.

Tallow Rendering Plant—Louis Stern's Sons, Inc., .th St. and Hackensack River, Kearny, N. J., awarded contract for 1 story, 125 x 1,250 ft. tallow rendering plant on 4th St., to James Mitchell, Inc., 575 West Side Ave., Jersey City, N. J. Estimated cost $40,000.

PATENT DIGEST

Baking and Milling

Soy Beans Treated With Steam to Temperature of 140 Deg. F. in a Vacuum of 24 In. for About 40 Minutes in Manufacture of Soy Bean Flour—William L. Shellabarger to Shellabarger Grain Products Co., Decatur, Ill. No. 1,867,541. July 12, 1932.

Odor and Flavor of Legume Flour Improved by Treatment With a Reducing Agent of the Lower Aliphatic Aldehydes—Louis W. Haas and Herbert O. Renner to J. R. Short Milling Co., Chicago, Ill. No. 1,870,450. Aug. 9, 1932.

Carbohydrates Oxidized to Oxalic Acid in Presence of Manganese Chloride—William E. Stokes, Rockville Center, N. Y., and Arnold H. Peter, New York, N. Y., to Royal Baking Powder Co., New York, N. Y. No. 1,870,472. Aug. 9, 1932.

Pie Dough Formed Into Cylindrical Mass, Chilled, and Sliced Into Crust Form—Ashley F. Ward to Ashley F. Ward, Inc., Cincinnati, Ohio. No. 1,870,882. Aug. 9, 1932.

Mechanical Handling and Shaping of Pie Crust—Dennis W. Smith, Wilmette, Ill., to Colborne Manufacturing Co., Chicago, Ill. Nos. 1,871,753, 1,871,754, and 1,871,755. Aug. 16, 1932.

Solid Hydroscopic Food Products Made From Wheat Germs and Containing Approximately 76 Per Cent Sugar, 15 Per Cent Protein and 5 Per Cent Ash—Charles Hoffman, Tuckahoe, N. Y., to Ward Baking Co., New York, N. Y. No. 1,873,709. Aug. 23, 1932.

Method of Making Ice Cream Cones That Will Not Wedge and Stick Together When Packed for Shipping—Werd W. Turnbull, Dayton, Ohio, to National Biscuit Co., New York, N. Y. No. 1,875,960. Sept. 6, 1932.

Canning and Glass Packing

Canned Foods Sterilized by Steam Prior to Covering and Sealing of Cans While Under Pressure—Alfred L. Kronquest, Syracuse, N. Y., to Continental Can Co., Inc., New York, N. Y. No. 1,863,447. June 14, 1932.

Method of Producing Homogenized Tomato Juice—William H. Gavin, San Jose, Calif., to Pratt-Low Preserving Co., Santa Clara, Calif. No. 1,874,181. Aug. 30, 1932.

Confectionery

Candy Batch Fed, Twisted, and Cut Into Stick Lengths by Machine With Unit Mounted for Rotation Upon Axis Transverse to Travel of Candy Mass Through Machine—Louis J. Propper, Chicago, Ill. No. 1,864,668. June 28, 1932.

Self-Contained Unit for Crystallization of Gum, Fondants and Sweetmeats—Andrew Gordon Hulme, Stockport, England, to Baker Perkins Co., Inc., Saginaw, Mich. No. 1,867,263. July 12, 1932.

Marshmallow Ring Filled With Ice Cream Between Top and Bottom Wafer Covers—Paul Wesley Clark, Los Angeles, Calif. No. 1,869,464. Aug. 2, 1932.

Confections Filled and Coated by Mechanical Means Which Provides for Hardening of Coating and Removal of Excess Material—Ira Schafer, San Diego, Calif. No. 1,871,089. Aug. 9, 1932.

Methods and Means for Conditioning Confectionery Molding Starch—Harold W. Harrigan, Melrose, Mass., to Hersey Manufacturing Co., Boston, Mass. No. 1,872,284. Aug. 16, 1932.

Method and Means for Producing Frozen Confections—William T. Comer to Crystal Carbonic Laboratory, Atlanta, Ga. No. 1,874,453. Aug. 30, 1932.

Spun Candy Heat-Treated in Chamber During Passage From Sizing to Forming Rolls—Edward J. Hambrecht, Palatine Bridge, N. Y., to Beech-Nut Packing Co., Canajoharie, N. Y. No. 1,874,973. Aug. 30, 1932.

Fruits and Vegetables

Automatic Production of Sugared Fruits—Berthold Gernhardt, Berlin, Germany. No. 1,861,307. May 31, 1932.

Vitamin A Concentrate Produced From Juices of Green Vegetables—Levon Arakel Agopian, Paris, France. No. 1,861,677. June 7, 1932.

Method of Preparing Starchy Food Materials for Deep-Fat Frying—Alvin H. Sweet, one-third to Chauncey A. Alexander and one-third to Robert C. Pearson, Los Angeles, Calif. No. 1,868,183. July 19, 1932.

Method for Producing Fruit Pectin Without Destroying Vitamin Content—William A. Rooker and Victor E. Speas to Speas Manufacturing Co., Kansas City, Mo. No. 1,870,588. Aug. 9, 1932.

Copies of Patents

Complete specifications of any United States patent may be obtained by remitting 10c. to the Commissioner of Patents, Washington, D. C.

Photostatic copies of foreign patents may be obtained at the same address, prices being forwarded on application.

Copies of patents should be ordered by number, as titles used in this digest seldom correspond with title of patent.

Dairy and Egg Products

Cheese Treated in Steam-Jacketed Horizontal Cooking Chamber Fitted With a Spiral Conveyor—Arthur W. Bell to Kraft-Phenix Cheese Corp., Chicago, Ill. No. 1,862,563. June 14, 1932.

Milk Powder Sealed in Containers in the Presence of Not More Than 5 c.c. of Free Oxygen per Pound of Powder—Helge Schidstad, Syracuse N. Y., to Borden Co., New York, N. Y. No. 1,863,355. June 14, 1932.

System Using Volatile Liquid Refrigerant for Freezing Ice Cream—Albert T. Light, Brooklyn, N. Y., to York Ice Machinery Corp., York, Pa. No. 1,866,988. July 12, 1932.

In Cheese Manufacture, Curd Is Steamed at a Temperature Between 110 and 145 Deg. F. Until Desired Acidity Is Attained—Frank M. G. Luecke, Nixa, Mo. No. 1,868,422. July 19, 1932.

Color Comparator for Judging Egg Meats—Mary E. Pennington to Borden Co., New York, N. Y. No. 1,868,542. July 26, 1932.

Cheese Manufactured by Surrounding Curds With an Inert Gas in an Airtight Container—Albert F. Stevenson, Ridgewood, N. J., to Borden Co., New York, N. Y. No. 1,868,547. July 26, 1932.

Eggs Preserved by Storage in Atmosphere of Carbon Dioxide—Paul Francis Sharp, Ithaca, N. Y. No. 1,868,996. July 26, 1932.

Coagulation of Frozen Eggs Prevented by Treatment With Pancreatin—Donald K. Tressler, Gloucester, Mass., to Frosted Foods Co., Inc., Dover, Del. No. 1,870,269. Aug. 9, 1932.

Dry Non-Hydroscopic Crude Lactose Prepared by Converting Whey to Powder Form and Then Treating With Water—Robert M. Washburn, Evanston, Ill., to Dee-Hy Products Co., Chicago, Ill. No. 1,870,270. Aug. 9, 1932.

Meat Packing

Meat Steaks Produced by Binding Several Pieces Together to Form a Unit Mass of Meat and Slicing After Freezing—Harden F. Taylor, Scardsdale, N. Y., to Atlantic Coast Fisheries Co., New York, N. Y. No. 1,864,285. June 21, 1932.

Smoke-House Trolley for Conveying Meat-Laden Baskets Placed in a Reclining Stacked Position so That Each Basket Serves as Support for Next Adjacent Basket—Alonzo Newton Benn, Chicago, Ill. No. 1,866,793. July 12, 1932.

Miscellaneous Products and Processes

Foil Removed From Bottles in Vertical Position—Albert F. Hoffman to Hoffman Beverage Co., Newark, N. J. No. 1,863,338. June 14, 1932.

Rice Malted in Manner to Permit Escape of Gases, to Prevent Matting During Germination, and to Accomplish Drying and Screening When Malting Is Completed—Peter J. Dax to Canada Malting Co., Ltd., Montreal, Canada. No. 1,865,680. July 5, 1932.

Concentrated Soluble Coffee Extract Prepared by Heating Ground Roasted Coffee With Anhydrous Glycerin at 80 to 90 Deg. C.—Eugene J. Lorand to Pennsylvania State College, State College, Pa. No. 1,866,414. July 5, 1932.

Concentrated Soluble Coffee Extract Prepared by Treating Particles of Roasted Coffee With a Solution of Sugar Mixture to Capture and Retain Characteristic Flavoring Ingredients of the Coffee—Eugene J. Lorand to Pennsylvania State College, State College, Pa. No. 1,866,415. July 5, 1932.

Crystallized or Partly Crystallized Sugar Solutions Heat-Treated in Unit Containing Disklike Stirring Element—Richard Bonath, Bussum, Netherlands, to Werkspoor N. V. No. 1,868,406. July 19, 1932.

In Manufacture of Sugar, Amount of Carbon Dioxide Gas Passed Into Body of Lime Juice Is Automatically Controlled Through Electrical Resistance Measurements—Elmer R. Ramsey, Denver, Colo., and Arthur W. Bull, Westport Conn., to Dorr Co., Inc. New York, N. Y. No. 1,868,472. July 19, 1932.

Method for Extracting Tea Aroma—Otto Strobach and Paul Albert Wickmann, Leipzig, Germany. No. 1,868,999. July 26, 1932.

Substrate for Mushroom Spawns Prepared by Treating Cereal Material With Water and Sterilizing—James W. Sinden to Pennsylvania State College, State College, Pa. No. 1,869,517. Aug. 2, 1932.

Preparation of Vitamin B and G Concentrates From Rice Polishings—Barnett Sure, Fayetteville, Ark. No. 1,869,721. Aug. 2, 1932.

Crystallization of Dextrose From Converted-Starch Solution—Clarence L. Sovereign, Riverside, Ill., to International Patent Development Co., Wilmington, Del. No. 1,870,030. Aug. 2, 1932.

Cereals and Solid Cereal Products Irradiated by Means of Mercury Vapor Lamps to Develop Anti-rachitic Activity Without Subsequent Injury to Anti-rachitic Content or to Palatability—Harry Steenbock to Wisconsin Alumni Research Foundation, Madison, Wis. No. 1,871,135. Aug. 9, 1932.

Unsaponifiable Lipoids Irradiated With Ultra-Violet Rays From Mercury Vapor Lamps to Produce Anti-rachitic Activity Without Subsequent Injury to Anti-rachitic Factor—Harry Steenbock to Wisconsin Alumni Research Foundation, Madison, Wis. No. 1,871,136. Aug. 9, 1932.

Method of Restoring Original Fresh Roasted Flavor to Stale Nuts—William W. Kelly to Nut Products Co. Cleveland, Ohio. No. 1,872,456. Aug. 16, 1932.

Sterilized Oyster Stew Preparation Containing Milk and Starch—Le Roy V. Strasberger, Baltimore, Md. No. 1,876,090. Sept. 6, 1932.

Sugar Juices Treated During Purification to Separate Complex Sugar Compounds From Complex Non-Sugar Compounds—John P. Foster, Paia, Territory of Hawaii. No. 1,876,491. Sept. 6, 1932.

Sugar Extracted From Sugar Cane in Such Manner as to Give Fiber and Other Byproducts of Commercial Value—Eugenio Antonio Vasquez, Havana, Cuba, to Vazcane Process, Inc., of Delaware. No. 1,876,522. Sept. 6, 1932.